51st Annual Wastewater Operators' Association Conference

Marriott Madison West Hotel & Conference Center
Middleton, Wisconsin

October 17 to October 20, 2017

Working to Keep Wisconsin Waters Clean

2017 Conference Committees

Local Arrangements:

Jim Johnson, Xylem, Inc.

Technical Committee:

Chair: Jeff Simpson

Lyle Lutz	Sharon Thieszen	Jeff Smudde
Bernie Robertson	Jeff Bratz	Karen Harter
Kevin Freber	John Bond	Marc Zimmerman
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WWOA OFFICERS

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Director (2018)	Rick Mealy
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Executive Secretary	Karen Harter

CONFERENCE MEETING ROOM GUIDE

Registration Booth – *Conference Center*

WWOA Promotions – *Atrium Area*

Pre-Conference Work Shops – *Biosolids 1 and Biosolids 3*

Regional Officers Meeting – *Lakes and Streams Room*

Tuesday Meet and Greet – *Atrium and Champions Ballroom*

Welcome Address & Keynote – *Champions Ballroom*

Technical Sessions – *Clean Waters, Lakes and Streams, Biosolids and Woods & Meadows Rooms*

Exhibitor Expo – *Conference Center*

Wednesday Walk Around Lunch – *Conference Center*

Operator Competition – *Expo Hall/Conference Center*

Wednesday Social Hour – *Expo Hall/Conference Center*

Thursday Social Hour – *Atrium Area/Clean Waters*

Awards Banquet – *Champions Ballroom*

Entertainment – *Clean Waters and Champions Ballroom*

Farewell Breakfast – *Aliquot Room/Conference Center*

Thank You

The WWOA would like to recognize the following individuals and organizations for their special contributions to the Conference:

On-Site Pre-Conference Registrations: Mona Johnson (ByTec Resource Management Inc.)

Registration Help: Mary Knude (Fond du Lac WWTP), Wendy Hanley (Baraboo WWTP), Teresa Lintner (New Holstein), Steve Meifert (Sheboygan WWTP), Chris Meifert (Plymouth)

Signage: Troy Larson, Randy Langer and other colleagues at Strand Associates

Abstract Booklet – Amy Kistner (AECOM)

Photography – Tom Crouse (Donohue & Associates)

Exhibitor Video Production – Ryan Mulcahy (Mulcahy Shaw Water)

Awards – Randy Herwig (MSA Professional Services)

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

51st Annual Conference

Wisconsin Wastewater Operators' Association

Tuesday, October 17, 2017

10:00 a.m. Shotgun start	Golf Outing: Pleasant View Golf Course, Middleton, WI
10:00 a.m. Shotgun start	Sporting Clays: Waunakee Gun Club, Dane, WI
9:30 a.m.	Bike Ride: Military Ridge State Trail, Madison, WI
2:00 p.m. – 4:00 p.m.	Registration Opens: Conference Center
1:00 p.m. – 4:00 p.m.	Pre-Conference Workshops: Biosolids Rooms 1 & 3
4:30 p.m. – 6:00 p.m.	Regional Officers Meeting: Lakes & Streams Room
6:00 p.m. – 9:00 p.m.	Meet and Greet: Champions Ballroom/Atrium (Beer, Wine, Soda, Cash Bar)
6:00 p.m. – 8:05 p.m.	Dinner buffet – Champions Ballroom/Atrium

Wednesday, October 18, 2017

7:00 a.m. – 5:00 p.m.	Registration Opens: Conference Center (Scan In & Out)
8:30 a.m. – 8:45 a.m.	Welcome Address: Champions Ballroom WWOA President Sharon Thieszen
8:45 a.m. – 10:00 a.m.	Keynote Address: Champions Ballroom LeRoy Butler, Green Bay Packers
10:00 a.m. – 5:00 p.m.	Exhibitor Expo: Conference Center
10:45 a.m. – 12:00 p.m.	Technical Sessions: Clean Waters/Lakes & Streams/Biosolids
12:00 p.m. – 1:30 p.m.	Walk Around Lunch: Conference Center
12:30 p.m. – 4:30 p.m.	Operator Competition: Expo Hall
1:30 p.m. – 4:00 p.m.	Technical Sessions: Clean Waters/Lakes & Streams/Biosolids
4:00 p.m. – 5:00 p.m.	Exhibitors Social Hour: Expo Hall

Thursday, October 19, 2017

7:00 a.m. – 4:30 p.m.	Registration Opens: Conference Center (Scan In & Out)
8:00 a.m. – 11:45 a.m.	Exhibitor Expo: Conference Center
8:00 a.m. – 11:45 a.m.	Technical Sessions: Clean Waters/Lakes & Streams/Biosolids
12:00 p.m. – 12:30 p.m.	Operators' Luncheon: Champions Ballroom
12:30 p.m. – 1:30 p.m.	Business Meeting: Champions Ballroom
12:30 p.m. – 4:30 p.m.	Septage Compliance Technical Session: Woods & Meadows
1:30 p.m. – 4:00 p.m.	Cross Plains WWTP Tour Departure: Convention Center Entrance (must pre-register at Conference Registration Booth for bus transportation)
1:30 p.m. – 4:00 p.m.	Technical Sessions: Clean Waters/Lakes & Streams/Biosolids
6:00 p.m. – 7:00 p.m.	Social Hour: Atrium
7:00 p.m. – 9:00 p.m.	Awards Banquet: Champions Ballroom
9:00 p.m. – 11:00 p.m.	Entertainment: Clean Waters/Champions Ballroom Comedian, Dobie Maxwell, Door Prizes (hosted beer & soda), Card Playing

Friday, October 20, 2017

7:30 a.m. – 11:00 a.m.	Registration Opens: Conference Center (Scan In & Out)
8:30 a.m. - 10:30 a.m.	Farewell Breakfast: Jeff Bratz, WWOA President and Greg Paul, Op2Myz Inc. – "The Gut Bug Connection"

Presenters

Presenter	Session	Time	Room
Allen, Rick	D-2	2:05 PM	Clean Waters
Allen, Rick	F-3	2:05 PM	Biosolids
Arora, Sid	I-2	8:50 AM	Biosolids
Barden, Mark/Kingman, Tim	L-2	10:55 AM	Biosolids
Bartel, Bruce/Becken, Jake/Cassity, Nathan	M-3	3:15 PM	Clean Waters
Bergels, Jim/Bratz, Jeff/Kleinschmidt, Jim	E-2	2:05 PM	Lakes & Streams
Boeldt, Michelle	Pre-Con #2	1:00 PM	Biosolids 3
Cantwell, Joseph	H-2	8:50 AM	Lakes & Streams
Carlson, Jane/Anderson, Travis	E-4	3:30 PM	Lakes & Streams
Davis, Scott	F-1	1:30 PM	Biosolids
Doriott, Jerry	B-2	11:25 AM	Lakes & Streams
Friedericks, Jim	F-2	2:05 PM	Biosolids
Geis, Steven	H-1	8:00 AM	Lakes & Streams
Gunderson, Greg	E-3	2:55 PM	Lakes & Streams
Hegeman, Fred	P-1	12:30 PM	Woods and Meadows
Hennessy, Ryan	A-1	10:45 AM	Clean Waters
Hopkins, Kevin	A-2	11:25 AM	Clean Waters
Korth, Phillip	N-1	1:30 PM	Lakes & Streams
Langer, Randy	D-3	2:55 PM	Clean Waters
Larson, Troy	K-1	10:00 AM	Lakes & Streams
Lefebvre, Chris	N-2	2:20 PM	Lakes & Streams
Mathos, Harry/Marten, Bill	M-1	1:30 PM	Clean Waters
Mealy, Rick	J-1	10:00 AM	Clean Waters
Mealy, Rick	J-2	10:55 AM	Clean Waters
Mealy, Rick/Geis, Steve	Pre-Con #1	1:00 PM	Biosolids 1
Miller, Leah	G-1	8:00 AM	Clean Waters
Milz, Derek	C-1	10:45 AM	Biosolids
Morrow, Pat	N-3	3:15 PM	Lakes & Streams
Mullholland, Brent	G-2	8:50 AM	Clean Waters
Muther, Steve/Goehner, Debbi	C-2	11:25 AM	Biosolids
Nall, Taryn	D-1	1:30 PM	Clean Waters
Nelson, Douglas	O-1	1:30 PM	Biosolids
Nenning, Tim/Butt, Jon	E-1	1:30 PM	Lakes & Streams
Robinson, Terry	M-2	2:20 PM	Clean Waters
Paul, Greg	K-2	10:55 AM	Lakes & Streams
Schramm, Scott	B-1	10:45 AM	Lakes & Streams
Schramm, Scott	L-1	10:00 AM	Biosolids
Schroedel, Rusty	F-4	3:30 PM	Biosolids
Schroedel, Rusty	I-1	8:00 AM	Biosolids
Skutt, Darin	D-4	3:30 PM	Clean Waters
Thieszen, Sharon/Steinbach, Tom/Larson, Troy	O-2 &O-3	2:20 PM	Biosolids

WWOA Pre-Conference Workshops
Located in Biosolids Room 1 and 3
Tuesday, October 17, 2017
1:00 p.m. - 4:00 p.m.

	Room / Moderator	
Time	**Workshop #1** **Biosolids 1** ***Marc Zimmerman***	**Workshop #2** **Biosolids 3** ***Tom Fitzwilliams***
1:00 p.m. to 2:25 p.m.	Lab Certification Changes to NR 149 *Steve Geis*	Core Elements for Successful Safety Program *Michelle Boeldt*
2:25 p.m. to 2:40 p.m.	Break	Break
2:40 p.m. to 4:00 p.m.	EPA has Changed the LOD Procedure…Have You? *Rick Mealy, George Bowman*	Core Elements for Successful Safety Program (continued) *Michelle Boeldt*

Pre-Conference Workshop Summary

Pre-Conference Workshop #1 – 1:00 PM - 2:25 PM
Moderator: Marc Zimmerman
Room – Biosolids 1
Presenters: Steve Geis
Presentation: Lab Certification Changes to NR 149

It has been 10 years since the last Lab Certification code revision. We will highlight the changes proposed in the new code. We will also spend some time helping you through some of the more common lab audit findings.

Pre-Conference Workshop #1 – 2:40 PM - 4:00 PM
Moderator: Marc Zimmerman
Room – Biosolids 1
Presenters: Rick Mealy, George Bowman
Presentation: EPA has Changed the LOD Procedure….Have You?

In December 2016, the EPA announced intent to promulgate substantial revisions to the infamous procedure for determination of an (MDL) LOD for the first time since its release in October 1984.

This workshop will focus on the history of the LOD, the 2-year process to revise the procedure, and culminating in an explanation of how the new procedure will work and what changes WWTP labs will have to make to their protocols. Examples of the revised procedure will be shared and there will be time for a Q&A session to ensure that labs are prepared to adopt the required changes.

While the rule status is in limbo since the new administration took over, this is more than likely to become reality in the very near future. It's valuable to be prepared and see what new twists are in store.

Pre-Conference Workshop #2 – 1:00 PM – 4:00 PM
Moderator: Tom Fitzwilliams
Room – Biosolids 3
Presenter: Michelle Boeldt
Presentation: Core Elements for Successful Safety Program

A successful safety program begins with building blocks of a safety management process. This presentation will go into detail and cover aspects of the 7 safety management building blocks: Management Leadership, Employee Participation, Hazard Identification and Assessment, Hazard Prevention & Control, Education & Training, Program Evaluation and Improvement, and Contractor Communication & Coordination.

The presentation will further dive into the Core Elements of each individual safety program that sustains the safety process: Bloodborne Pathogens, Confined Space Entry, Control of Hazardous Energy (Lockout), Personal Protective Equipment, Hazard Communication, Occupational Noise Exposure. Respiratory Protection, Fall Protection, Emergency Evacuation & Fire Protection, and Excavation. Each Core Element will review a basic description, program requirements, common regulatory violations, and training aspects and frequency required for a successful safety program.

WWOA TECHNICAL PROGRAM SCHEDULE Wednesday, October 18, 2017 CECs: 5.0 General Septage, 5.0 Wastewater, 3.0 Municipal Waterworks			
Champions Ballroom **Welcome Address** – WWOA President Sharon Thieszen – 8:30 a.m. **Keynote Speaker** – LeRoy Butler, Green Bay Packers			
Exhibits 10:00 a.m. – 5:00 p.m. in Conference Center			
Time	**Session A: Activated Sludge** **Moderator: *Bernie Robertson*** **Room: Clean Waters**	**Session B: Lagoons** **Moderator: *Jeff Bratz*** **Room: Lakes & Streams**	**Session C: SCADA/Computers** **Moderator: *Lyle Lutz*** **Room: Biosolids**
10:45 – 11:20	Septicity/VFA's: "Double Edge Sword" *Ryan Hennessy*	Lagoons *Scott Schramm*	SCADA Data-Getting Past Trends *Derek Milz*
11:25 – 12:00	Troubleshooting a Municipal WWTP Leads to Improved Industrial Pre-Treatment *Kevin Hopkins*	Energy Savings Due to WWTP Upgrade for Lagoons *Jerry Doriott*	"The Times They are a Changing" *Steve Muther, Debbi Goehner*
Walk Around Lunch: Conference Center – 12:00 - 1:30 p.m. **Operators Competition: Expo Hall – 12:30 – 4:30 p.m. CECs: 6 hrs Wastewater**			
Time	**Session D: Collection Systems** **Moderator: *Nate Tillis*** **Room: Clean Waters**	**Session E: Phosphorus Compliance** **Moderator: *Jeff Smudde*** **Room: Lakes & Streams**	**Session F: Biosolids** **Moderator: *Ryan Mulcahy*** **Room: Biosolids**
1:30 – 2:00	Overview of Sanitary Sewer Management Programs *Taryn Nall*	What We Learned from Our Operational Evaluation Report (OER) *Tim Nenning, Jon Butt*	Reed Bed Technology *Scott Davis*
2:05 – 2:40	The Dreaded "Flushables". Are they Really Flushable? *Rick Allen*	Watershed Based Approach to Phosphorus Compliance *Jim Bergles, Jeff Bratz, Jim Kleinschmidt*	Land Application of Sludge *Jim Friedericks*
Break: Exhibit Area 2:40 p.m. – 2:55 p.m. in Conference Center			
2:55 – 3:25	Comprehensive Manhole Assessment & Rehabilitation Program – Fond du Lac Case Study *Randy Langer*	City of Brodhead's PO4 Trading Plan *Greg Gunderson*	Solids Reduction *Rick Allen*
3:30 – 4:00	Collection System Odor Control *Darin Skutt*	Regulations, Watershed Issues *Jane Carlson, Travis Anderson*	A Solution to Too Much Biosolids *Rusty Schroedel*
Social Hour: Expo Hall 4:00 p.m. - 5:00 p.m.			

Wednesday, October 18

Session A: Activated Sludge

Moderator: Bernie Robertson

Room: Clean Waters

10:45 AM to 11:20 AM – Septicity/VFA's: "Double Edge Sword"

Presenter(s): Ryan Hennessy

Affiliation: Midwest Contract Operations

Presentation describes what volatile acids, how they are formed, their importance in enhanced biological nutrient removal, and their potential impacts on sludge quality.

Wednesday, October 18

Session A: Activated Sludge

Moderator: Bernie Robertson

Room: Clean Waters

11:25 AM to 12:00 PM – Troubleshooting a Municipal WWTP Leads to Improved Industrial Pre-Treatment

Presenter(s): Kevin Hopkins

Affiliation: Strand Associates

In early 2014 the Lake Mills wastewater treatment plant (WWTP) began to experience upset conditions, including higher than normal effluent BOD and TSS concentrations, as well as poor settling sludge in the final clarifiers. A review of operation strategies was completed to rule out the likelihood that issues were being caused at the treatment plant. Troubleshooting efforts included experimentation with coagulants, use of bio-augmentation products, and investigating industrial and commercial dischargers. It was determined that key industrial dischargers were discharging wastewaters with deleterious substances. Increased monitoring and permitting of key industries have resulted in improvements in WWTP operations and effluent quality.

Wednesday, October 18

Session B: Lagoons

Moderator: Jeff Bratz

Room – Lakes & Streams

10:45 AM to 11:20 AM – Lagoons

Presenter(s): Scott Schramm

Affiliation: Strategic Municipal Services

A. **Background**. Over 60% of public treatment facilities employ some form of lagoon treatment. Lagoons have distinct advantages related to ease of operations and cost. Understanding their inherent limitations is critical to consistently meeting low effluent limits. This presentation will provide example data and case studies to support the main concepts. **B**. **Challenges**. This presentation will review how lagoons can meet very low phosphorous, ammonia and solids limits. We will discuss key limiting factors including "dilute" biology, seasonal and daily temperature changes and long retention times that affect consistent treatment. **C**. **Strategic Solutions**. Lagoons can achieve stringent effluent requirements by understanding the relationships of waste characteristics, temperature, biology requirements, flow patterns, technology and Code alternatives. Lagoons also have operational flexibility based on high hydraulic retention times and seasonal discharges. We will discuss the critical biologic, environmental and facility factors that can limit consistent treatment. Recent pilot projects have demonstrated that lagoons can meet very low TMDL phosphorous, solids and ammonia requirements.

Wednesday, October 18

Session B: Lagoons

Moderator: Jeff Bratz

Room – Lakes & Streams

11:25 AM to 12:00 PM – Energy Savings Due to WWTP Upgrade for Lagoons

Presenter(s): Jerry Doriott

Affiliation: SEH

The Ladysmith WI (Population 3,367) Wastewater Treatment Plant (WWTP) is an aerated lagoon system. It had 3 large lagoons utilizing coarse bubble diffusion and 4 large blowers. Working with Focus on Energy, a small grant was obtained to help upgrade the lagoon system to fine bubble diffusers with new energy efficient blowers. Other upgrades were also constructed. The upgrade allowed the largest lagoon to be eliminated and reducing blowers required to 1 smaller blower for the two remaining lagoons. After the upgraded WWTP was operating, it was proven that energy usage, as predicted, was cut significantly.

Presentation will describe the old system, how the work with Focus on Energy occurred, what was designed and constructed, how the WWTP is currently operating, and detail the energy saved and what maintenance issues have decreased.

Wednesday, October 18

Session C: SCADA/Computers

Moderator: Lyle Lutz

Room – Biosolids

10:45 AM to 11:20 AM – SCADA Data-Getting Past Trends

Presenter(s): Derek Milz

Affiliation: Wonderware Midwest

Historical trending software tells us how our facilities and assets are running every day, month, or year. Sitting down at our desks first thing in the morning, we get a story of how the plant or distribution system is running with those trends. The real power for making informed decisions though, is transforming the raw data behind those trends into actionable insights --- in the right format for the right individual. In this presentation, we will cover the automation of data collection from your instruments, data transformation to add context, automating regulatory reporting, and providing easy to use analysis tools for your team in order to save time and money.

Wednesday, October 18

Session C: SCADA/Computers

Moderator: Lyle Lutz

Room – Biosolids

11:25 AM to 12:00 PM – "The Times They are a Changing"

Presenter(s): Steve Muther, Debbi Goehner

Affiliation: Muermann Engineering

Technology does not stand still. Some of the instrumentation and control system capabilities available today didn't even exist five or ten years ago. If they did, they were not know to be reliable, or may have been cost prohibitive. Municipal wastewater and water plants are not insulated from the "changin' times." And that's a good thing, because these changes can have a positive impact on your operation if you understand what is available and how to make the most of it. This presentation will focus on recent developments in instrumentation, controls, communication, and plant management software plant staff should be aware of.

Wednesday, October 18

Session D: Collection Systems

Moderator: Nate Tillis

Room – Clean Waters

1:30 PM to 2:00 PM – Overview of Sanitary Sewer Management Programs

Presenter(s): Taryn Nall

Affiliation: Ruekert & Mielke

The City of Menasha started an extensive sanitary sewer evaluation survey (SSES) and sewer rehabilitation program in 2002 to reduce I/I by correcting defects and structural deficiencies. The program, over the past 15 years, was performed throughout the entire collection system in four phases to make the program more manageable, prioritize drainage districts having highest I/I, reduce manpower requirements, and spread out capital cost requirements. The SSES programs included manhole inspection, smoke testing, sewer televising, sanitary lateral televising, sump pump inspection, and dye testing. The sewer rehabilitation programs included manhole rehabilitation or replacement, CIPP lining, pressure inject grouting joints and cracks, lateral connection grouting, and sewer replacement. The sewer management programs were successful in reducing I/I and extending the service life of the sanitary sewer system which is a major objective of the CMOM program. Extensive evaluations were performed to identify appropriate SSES programs and rehabilitation programs. The programs involved selecting procedures, equipment, materials, and construction methods to meet goals and expectations for I/I removal, structural defect correction needs and general asset management.

Wednesday, October 18

Session D: Collection Systems

Moderator: Nate Tillis

Room – Clean Waters

2:05 PM to 2:40 PM – The Dreaded "Flushables". Are They Really Flushable?

Presenter(s): Rick Allen

Affiliation: Advanced Professional Consultant

In **The Dreaded Flushables**, Rick Allen will discuss one of the new emerging trends in wastewater operations. Today, municipalities large and small are being inundated with materials that should never be "Flushed."

Probably, the most challenging and costly plague affecting wastewater operations everywhere are products promoted as "Flushable" that are not bio-degradable. These materials are advertised in ways that negatively impact wastewater operations. Massive amounts of materials are causing problems in our collection systems, or are causing unnecessary challenges with lift stations, pumps and equipment in wastewater treatment operations. Rick looks forward to leading a lively debate and conversation on creating awareness within operations and communities to engage in "Non-Flushable Behaviors" around products that should never be in our sewers and sewer plants.

The challenges of these materials being disposed of in wastewater systems are numerous and costly. In the Dreaded Flushables, Rick will discuss the challenges and costs of these materials in operations nationally. Additionally, there are opportunities to discuss the educational opportunities to provide training and education to operational staff, managers and the public. In a national and international debate, there are opportunities to engage the public with this growing concern that is causing municipalities around the world expensive and challenging operational difficulties.

Wednesday, October 18

Session D: Collection Systems

Moderator: Nate Tillis

Room – Clean Waters

2:55 PM to 3:25 PM – Comprehensive Manhole Assessment & Rehabilitation Program – Fond du Lac Case Study

Presenter(s): Randy Langer

Affiliation: Strand Associates

Sanitary sewer manholes are typically "out of site and out of mind" and often do not receive required attention and maintenance. This often leads to increased infiltration and inflow (I/I) that can negatively impact WWTP Performance and ultimately increase conveyance and treatment costs.

In an effort to improve the condition of the sanitary sewer collection system and ultimately reduce I/I, the City of Fond du Lac undertook a comprehensive manhole assessment and rehabilitation program in 2009. After 8 years of assessments and rehabilitation projects, the overall condition of the City's more than 4,000 manholes has improved dramatically. The proposed discussion will include:

- A summary of the assessment process
- Types of manhole rehabilitation techniques and products utilized, including commentary on appropriate uses of each
- A summary of project costs, including costs per year, and overall cost per manhole for rehabilitation
- Data summaries:
  - Overall condition of manholes from 2009 to present
  - Number of manholes requiring various types of rehabilitation
- Discussion regarding I/I removal
- Lessons learned

Wednesday, October 18

Session D: Collection Systems

Moderator: Nate Tillis

Room – Clean Waters

3:30 PM to 4:00 PM – Collection System Odor Control

Presenter(s): Darin Skutt

Affiliation: Carus Corporation

This presentation will cover odor issues in the collection system including what types of odor to be expected, how are they formed, and what you can do about these odors. For collection systems including lift stations with utilities or long retention times, permanganate/nitrate blend solutions to these odor issues will be discussed including the chemistry behind the treatment, equipment required for feeding, and case studies on field applications at several facilities in the US. For remote lift stations or gravity sewers where feed equipment is not practical, controlled release permanganate tablets will provide fast reactions with hydrogen sulfide (on the order of seconds) and other organic odor-producing compounds, making it an excellent choice when retention times are very short. Case studies on field applications of permanganate tablets will be covered including how they are applied in the collection system and usage rates.

Wednesday, October 18

Session E: Phosphorus Compliance

Moderator: Jeff Smudde

Room – Lakes & Streams

1:30 PM to 2:00 PM – What We Learned From Our Operational Evaluation Report (OER)

Presenter(s): Tim Nenning, Jon Butt

Affiliation: Village of Grafton Water & Wastewater Utility, Symbiont Engineers, Scientists and Constructors

The Village of Grafton received a revised WPDES permit July 1, 2015. Like many others, the new permit advised the Village of future Water Quality Based Effluent Limits (WQBEL's) for total pollutant loadings. One of the WQBEL's was a phosphorous concentration limit of 0.075 mg/L for a 6-month average. Approximately 6 months after the permit was issued, the draft waste load allocations from the Milwaukee River Total Maximum Daily Load (TMDL) were issued, providing the Village with monthly mass limits.

The first WDNR deliverable in Grafton's total phosphorus compliance schedule was to prepare an Operation Evaluation Report (OER). Working with its consultant, Grafton identified several items that it would investigate to determine their impacts on phosphorus removal at the wastewater treatment plant and within the receiving water body. These investigations were completed and this presentation will summarize the various lessons learned, including:

- River sampling is worthwhile – Grafton discharges to the Milwaukee River. Dam removal projects improved river water quality conditions in the vicinity of the Village's WWTP outfall. The Village began a sampling program that yielded results which helped during the permit development process and review of future compliance options.
- We have SNRP – Testing of the wastewater effluent indicated that as much as 0.1 mg/L Soluble Non-Reactive Phosphorus (SNRP) is present. Further investigations revealed that the Village adds a polyphosphate product to the potable water supply, therefore its presence in the wastewater. More investigation is required to determine if this is a source of SNRP.
- Industrial contribution of total phosphorus is almost zero - Eleven significant industrial facilities discharge phosphorus into the collection system, but their total contributions are less than 2 lbs/day or about 3% of the total influent phosphorus.
- Why do we add chemical there? – The current WWTP practice is to add coagulant to the primary clarifier influent. This location serves the City well in regards to the current permit requirements but might not be optimum for future compliance and performance requirements.
- Jar testing looks good - Jar testing four different coagulants illustrated that either ferric or alum had the potential to reduce the effluent total phosphorus as part of a dual point chemical addition strategy.
- The TMDL says what? – The draft mass allocations are a bit confusing in that October has the lowest allocation while April has the highest. While it is understood that the allocations are heavily impacted by watershed flow, it seems counterintuitive to restrict phosphorus from the watershed at a time when algae growth is less of a problem (October) and allow more phosphorus to enter the watershed ahead of accelerated algae growth (April). Temperature, sunlight, ecosystem disturbance, hydrology and chemistry are all factors when considering algal growth.
- That's a lot of acres – Initial watershed planning investigations indicate that the Village would need over 3,000 acres of watershed Best Management Practices (BMP's) to produce enough credits to offset the current discharge at the WWTP through nutrient trading using a trade ratio of 2 with the potential of requiring an additional 3,800 acres to cover the WWTP's currently rated design flow.

The Village has learned much through the OER process. Regional watershed discussions have started between regional stakeholders. Review of current operations should help to improve current WWTP performance regarding Phosphorous discharges. The Village believes that the OER process will help steer them toward an optimum solution. Perhaps other permit holders can learn and benefit from Grafton's experience.

Wednesday, October 18

Session E: Phosphorus Compliance

Moderator: Jeff Smudde

Room – Lakes & Streams

2:05 PM to 2:40 PM – Watershed Based Approach to Phosphorus Compliance

Presenter(s): Jim Bergles, Jeff Bratz, and Jim Kleinschmidt

Affiliation: City of Burlington, Western Racine County Sewerage District, and Baxter & Woodman

Several municipal wastewater treatment facilities that discharge to the Fox (Illinois) River were in similar situations when their most recent Wisconsin Pollution Discharge Elimination System (WPDES) permits were issued. A group of communities decided to form an intermunicipal governmental group to assist with common WPDES permit issues. The founding communities of the Illinois Fox River Group include Burlington (Fox River main stem discharger), Western Racine County Sewerage District (Fox River main stem discharger), East Troy (Honey Creek to Fox River), Lyons Sanitary District No. 2 (White River to Fox River), Town of Norway Sanitary District (Wind Lake Canal to Fox River), and Eagle Lake Sanitary District (Eagle Creek to Fox River). Each of these communities also filed a contested case for the proposed phosphorus limits in their WPDES permits.

The primary goal of this group is to pool resources needed to obtain either a site specific criteria for the main stem of the Fox River or to support a variance request for reasons other than economic. Dischargers on the tributaries have joined the group because they could potentially be given a limit based on their ultimate discharge to the “downstream” Fox River. One of the primary reasons the group formed was the unlikelihood of a TMDL being done on the Fox River anytime in the near future despite the Fox River being listed as impaired for phosphorus. Data on the watershed needed to be collected to determine the current state of the watershed and better understand the phosphorus contributions by various sources in the watershed. This group focus at the present time in the watershed downstream of the Rochester, WI dam which is the last impoundment in the river prior to its discharge to Illinois.

Wednesday, October 18

Session E: Phosphorus Compliance

Moderator: Jeff Smudde

Room – Lakes & Streams

2:55 PM to 3:25 PM – City of Brodhead's PO4 Trading Plan

Presenter(s): Greg Gunderson

Affiliation: MSA Professional Services

Faced with stringent phosphorus limits, the City of Brodhead and MSA Professional Services, Inc. conducted a detailed feasibility analysis to determine what alternatives required a more detailed evaluation. The outcome of the feasibility analysis was clear – Water Quality Trading was likely to be the most cost-effective approach. However, there were numerous risks and pitfalls that can be difficult to recognize and measure. The presentation discusses how the City successfully navigated the process to complete a phosphorus trading plan. The presentation will review how to identify, quantify, and evaluate potential trading credits, and how to successfully negotiate a trade agreement.

Wednesday, October 18

Session E: Phosphorus Compliance

Moderator: Jeff Smudde

Room – Lakes & Streams

3:30 PM to 4:00 PM – Regulations, Watershed Issues

Presenter(s): Jane Carlson, Travis Anderson

Affiliation: Strand & Associates

Water quality trading (WQT) provides wastewater treatment plants with an opportunity to comply with stringent new effluent limits through pollutant reductions from other sources in the watershed. Like watershed adaptive management, WQT is a watershed based compliance option to address phosphorus water quality based effluent limitations. Due to the costs associated with tertiary treatment systems and the complexity of implementing watershed adaptive management, WQT may be the most economical solutions for many communities. The presentation provides several examples of how communities throughout the state are navigating the WQT process. Specifically, the following topics will be discussed:

- A brief overview of the WQT process and how it may be used in a combination with WWTP upgrades in a cost effective manner
- Opportunities for generating phosphorus credits through "in-house" improvements such as urban stormwater management or public park improvements
- Identifying potential trading partners in the agricultural community
- Examples of potential water quality trading projects at several communities with the following components:
  - Streambank restoration
  - Conversion of agricultural land to public park space or other beneficial use
  - Improvements to agricultural land such as installing filter strips
  - Treatment of agricultural runoff through detention basins

Wednesday, October 18

Session F: Biosolids

Moderator: Ryan Mulcahy

Room – Biosolids

1:30 PM to 2:00 PM – Reed Bed Technology

Presenter(s): Scott Davis

Affiliation: Constructed Wetland Group

We invite you to join us for an informal and informative presentation to discuss the practical application of reed bed technology today including experiences of early pilot facilities through flagship and showcase projects. We'll also cover and give you a brief overview of the history of the innovative and proven approach.

Reed bed technology is an innovative method of treating biosolids, chemical slimes and hydroxide colloids originally developed by the Max-Planck Institute of Germany in 1970. Some of our facilities have been in operation for more than 30 years and we have operating facilities in 23 states.

Specifically, this presentation will address details regarding designing a successful reed bed, typical and alternative construction methods and costs, the development of the reed bed process, operational and maintenance considerations, and reed bed evacuation and recycling.

Requirements can differ depending on climatic conditions, influent and biosolids quality, and the unit processes utilized by the treatment facility. We will explore the plants' role in the reed bed system and the bio-dynamics of the process. Finally, and most importantly, we will discuss the cost benefits that reed bed technology will provide a township versus using conventional biosolids disposal methods. A question and answer period will follow the presentation in which site-specific recommendations can be reviewed.

Wednesday, October 18

Session F: Biosolids

Moderator: Ryan Mulcahy

Room – Biosolids

2:05 PM to 2:40 PM – Land Application of Sludge

Presenter(s): Jim Friedericks

Affiliation: AgSource Laboratories

Land application of wastewater sludge, and water treatment lime sludge, are limited under regulations by the quality of the sludge and the agronomic rates that are acceptable on the land. But what are those rates? What do they mean and how are they calculated? Take a look at sludge from an agronomic perspective to see the value of these resources as fertilizer or as a soil amendment. Calculations and an example will be presented for better understanding. There is more to land applying sludge than disposal.

Wednesday, October 18

Session F: Biosolids

Moderator: Ryan Mulcahy

Room – Biosolids

2:55 PM to 3:25 PM – Solids Reduction

Presenter(s): Rick Allen

Affiliation: Advanced Professional Consultant

Attendees will gain an understanding of solids handling, different approaches and technologies for managing solids and the cost of handling sludge and solids.

Description: Solids Reduction discusses the need to evaluate solid handling and ways to improve solid wasting. Most plants, whether mechanical or lagoon need to improve their wasting and reduce the amount of solids handling. Rick will cover the need to look at the real cost of handling solids and some of the emerging issues around solids removal including growing restrictions on bio-solid management. Every wastewater facility is facing a growing sludge problem with sludge handling and accumulation becoming more regulated every year. In Solids Reduction operators will learn valuable information about reducing sludge build-up in lagoons and WWTP plants, along with new proposed monitoring requirements for sludge and how to address the issue before it becomes regulated.

In **Solids Reduction** Rick covers how to save municipal waste water system's budgets by improving wasting and reducing the amount of material that needs to be disposed and hauled. As a part of their business efficiencies, all systems should now be considering solutions for managing solids.

Additionally, some of the biological and chemical reasons for sludge management will be discussed as they relate to nutrient loading, NPDES permits, bio-solids handling, energy costs and budget costs. The review of emerging issues related to the use of chemicals and biological treatment methods for bio-nutrient removal will be discussed as it relates to permits for solids or wastewater discharging.

Wednesday, October 18

Session F: Biosolids

Moderator: Ryan Mulcahy

Room – Biosolids

3:30 PM to 4:00 PM – A Solution to Too Much Biosolids

Presenter(s): Rusty Schroedel

Affiliation: AECOM

The Village of Amherst WWTF has a design flow of 0.18 MGD. The existing aerated sludge storage tank has a capacity of approximately 173,900 gallons. The facility is currently receiving influent (BOD) loadings that are in excess of the design mass loading for the facility due to loadings from a local brewery. The local brewery has been growing steadily since 2007, when they first started production. Despite loadings in excess of design, the plant has maintained compliance but did not have adequate sludge storage. Through a study, evaluation of rates, and design, the village authorized construction of a new storage tank.

WWOA TECHNICAL PROGRAM SCHEDULE Thursday, October 19, 2017 CECs: 6.5 General Septage, 6.5 Wastewater, 5.0 Municipal Waterworks			
Exhibits 8:00 a.m. – 11:45 p.m. in Conference Center Cross Plains Plant Tour 1:30 p.m. - 4:00 p.m. (Bus leaves from Conference Center)			
Time	**Session G: Nutrient Removal Moderator: *Don Lintner* Room: Clean Waters**	**Session H: Regulatory Issues Moderator: *Rick Mealy* Room: Lakes & Streams**	**Session I: Energy Moderator: *Kelly Zimmer* Room: Biosolids**
8:00 – 8:45	BPR and Chemical Coagulation in an Industrial Activated Sludge WWTP (Cheese) Plant *Leah Miller*	Lab Certification Changes to NR 149 *Steven Geis*	Is It Really Cost Effective to Use My Digester Gas? *Rusty Schroedel*
8:50 – 9:35	Plant Operations/ Performance Monitoring *Brent Mulholland*	Treatment Facility Performance *Joseph Cantwell*	Minimizing Mixing Energy in Activated Sludge Selector Basins *Sid Arora*
Break: Exhibit Area 9:35 a.m. - 10:00 a.m. in Conference Center			
Time	**Session J: Nutrient Removal Moderator: *Kevin Freber* Room: Clean Waters**	**Session K: Computer Application Moderator: *Troy Larson* Room: Lakes & Streams**	**Session L: Construction Moderator: *Jim Johnson* Room: Biosolids**
10:00 – 10:50	Trace Metal Considerations When Phosphorus Chemicals are Used *Rick Mealy*	Practical Uses for Excel at POTWs *Troy Larson*	Public Construction *Scott Schramm*
10:55 – 11:45	Phosphorus: Crossover Chemical for Water Supply Impacts Wastewater *Rick Mealy*	Excel and Word: Making Record Keeping Easy *Greg Paul*	City of Rhinelander Downtown Reconstruction *Mark Barden, Tim Kingman*
Operators Luncheon – 12:00 p.m. / Business Meeting – 12:30 p.m. – Champions Ballroom			
Time	**Session M: Nutrient Removal Moderator: *John Bond* Room: Clean Waters**	**Session N: Resource Recovery Facility Operations Moderator: *Jeremy Cramer* Room: Lakes & Streams**	**Session O: Poop-er-ee Moderator: *Sharon Thieszen* Room: Biosolids**
1:30 – 2:15	25 Years of Biological Nutrient Removal & Clean Water *Harry Mathos, Bill Marten*	Return Activated Sludge – Why it Matters – How to Optimize *Phillip Korth*	Are the Operators Helping the Students or Vice Versa *Douglass Nelson*
2:20 – 3:05	Nutrient Removal/Recovery *Terry Robinson*	Utilizing Excess Facility Capacity *Chris Lefebvre*	Tricks of the Trade *Sharon Thieszen, Tom Steinbach, Troy Larson*
3:15 – 4:00	Optimization in Practice: Case Studies from NEW Water's Phosphorus & TSS Optimization Plans *Bruce Bartel, Jake Becken, Nathan Cassity*	How Drones Streamline and Enhance Wastewater Planning and Design *Pat Morrow*	Tricks of the Trade *Sharon Thieszen, Tom Steinbach, Troy Larson*

WWOA TECHNICAL PROGRAM SCHEDULE
Thursday, October 19, 2017
CECs: 4.0 Septage Compliance

Session P: Septage Compliance and Master Operator Training

Woods & Meadows 12:30 p.m. – 4:30 p.m.
Moderator: Steve Geis

Presenter: Fred Hegeman, P.E., WNDR

Social Hour – 6:00 p.m. to 7:00 p.m. Marriott Atrium/Clean Waters
Awards Banquet/Entertainment – 7:00 p.m. to 11:00 p.m. Champions Ballroom/Clean Waters

Thursday, October 19

Session G: Nutrient Removal

Moderator: Don Lintner

Room – Clean Waters

8:00 AM to 8:45 AM – BPR and Chemical Coagulation in an Industrial Activated Sludge WWTP (Cheese) Plant

Presenter(s): Leah Miller

Affiliation: Foremost Farms

In order to decrease the Total Phosphorus in the plant's Effluent, several projects were trialed. BPR was optimized within plant parameters, Cerium Chloride was trialed as a coagulant, and polymer was added in front of the sand filters. Successes and challenges will be described here.

Thursday, October 19

Session G: Nutrient Removal

Moderator: Don Lintner

Room – Clean Waters

8:50 AM to 9:35 AM – Plant Operations/Performance Monitoring

Presenter(s): Brent Mulholland

Affiliation: Johnsonville Sausage

Operators at Johnsonville Sausage utilize spreadsheets to track and control both wastewater treatment plants. In addition, the data that is compiled is used for our DMR, as well as draws attention to maintenance issues as well as provides valuable information to engineering firms in preparation for expansion/upgrades to each system.

Thursday, October 19

Session H: Regulatory Issues

Moderator: Rick Mealy

Room – Lakes & Streams

8:00 AM to 8:45 AM – Lab Certification Changes to NR 149

Presenter(s): Steven Geis

Affiliation: Wisconsin Department of Natural Resources

It has been 10 years since the last Lab Certification code revision. We will highlight the changes proposed in the new code. We will also spend some time helping you through some of the more common lab audit findings.

Thursday, October 19

Session H: Regulatory Issues

Moderator: Rick Mealy

Room – Lakes & Streams

8:50 AM to 9:35 AM – Treatment Facility Performance

Presenter(s): Joseph Cantwell

Affiliation: Leidos Engineering LLC

The 2017 Compliance Maintenance Annual Report (CMAR) will contain a number of requests for energy use information from the wastewater treatment facility and/or collection system. This will be the initial collection of this data.

The proposed presentation will present a summary of results on the energy use data collected including: the range of energy use per flow information (kWh/MG) for each facility in the state; the range of energy use per WDNR District; the range of energy use per various hydraulic flow ranges (0 – 0.1 MGD; 0.1 – 0.25 MGD; 0.25 – 0.50 MGD; 0.5 – 1.0 MGD; 1.0 – 5.0 MGD); and additional flow ranges to show variations in the energy used. The data may also be presented in comparison of organic loading (kWh/1,000 pounds of BOD), as well as its relevance to the type of treatment process utilized at each wastewater treatment facility.

In conclusion, the presentation will provide a summary of the energy use data collected and analyzed and it will provide insight to the system operations staff if they have opportunities to reduce their energy use.

Thursday, October 19

Session I: Energy

Moderator: Kelly Zimmer

Room – Biosolids

8:00 AM to 8:45 AM – Is It Really Cost Effective to Use My Digester Gas?

Presenter(s): Rusty Schroedel

Affiliation: AECOM

In this era of sustainability and energy efficiency, there has been a significant push to use anaerobic digestion to create digester gas and use it for energy production and heat recovery, referred to as combined heat and power (CHP). A brief summary of five example projects will be presented and discussed where it was determined that CHP was not cost-effective, where existing CHP systems have issues such that they may not be cost-effective to retain or upgrade in the future, and where the introduction of off-site wastes into the digestion was determined to not be cost-effective.

Thursday, October 19

Session I: Energy

Moderator: Kelly Zimmer

Room – Biosolids

8:50 AM to 9:35 AM – Minimizing Mixing Energy in Activated Sludge Selector Basins

Presenter(s): Sid Arora

Affiliation: Milwaukee Metropolitan Sewage District

With the goal to minimize energy consumption in the BNR process, a mixing energy pilot study was conducted at Milwaukee MSD's South Shore Water Reclamation Facility in Milwaukee, Wisconsin. Results show that power consumption of only 0.28 W/m3 is sufficient to fully homogenize activated sludge. In 3 identical basins, 48 ft long x 30 ft wide x 15 ft deep, (21,600 cubic feet) the study compared 3 mixing methods: Large Bubble, Submersible Horizontal Propeller, and Fine Bubble Diffused Air. The study concludes that the submersible propeller mixer consumed the least amount of energy while still providing good mixing and treatment, achieving both successful mixing and nutrient removal consuming only 170 W.

Thursday, October 19

Session J: Nutrient Removal

Moderator: Kevin Freber

Room – Clean Waters

10:00 AM to 10:50 AM – Trace Metal Considerations When Phosphorus Chemicals are Used

Presenter(s): Rick Mealy

Affiliation: Wisconsin Department of Natural Resources

Many WWTPS are seeing great phosphorus removal results when using state-of-the-art treatment chemicals. The down-side of the newer chemicals, which contain rare earth metals, is that the rare earth metals—being rarely encountered—can cause interference when trace metals in effluent and biosolids are analyzed by ICP or ICP/MS. The interference results in high bias in results of some priority pollutant chemicals, notably arsenic.

It is important to understand that this bias can be removed if labs properly correct for the interference at the instrument level. In order to do, so, though, the lab has to be aware what treatment chemical(s) were used and must also have evaluated the interferences using their instrument and operating conditions.

This talk will focus on critical considerations and discussions that must occur between WWTPs and testing labs.

Thursday, October 19

Session J: Nutrient Removal

Moderator: Kevin Freber

Room – Clean Waters

10:55 AM to 11:45 AM – Phosphorus: Crossover Chemical for Water Supply Impacts Wastewater

Presenter(s): Rick Mealy

Affiliation: Wisconsin Department of Natural Resources

Many municipal water supply systems add phosphate or polyphosphate for corrosion control or to sequester iron and manganese. The addition of phosphorus to the system ultimately winds up at the treatment plant.

This talk will cover the use of phosphorus in water supplies and the impacts it can have on other chemical additions testing as well as its impact to WWTPs.

This talk will have benefit for water supply operators, and tangentially for WWTP operators.

Thursday, October 19

Session K: Computer Application

Moderator: Troy Larson

Room – Lakes & Streams

10:00 AM to 10:50 AM – Practical Uses for Excel at POTWs

Presenter(s): Troy Larson

Affiliation: Strand Associates, Inc.

Spreadsheets are a powerful tool for collecting, organizing, and calculating information. This presentation will share information for beginner and intermediate level computer users and will feature Excel tools developed for wastewater treatment facilities as examples. Discussions will include:

- Tips for getting started using Excel.
- Comparisons between spreadsheets and databases for managing information at a WWTP.
- Example applications for spreadsheets such as data collection, lab bench sheets, logging information, forms, process calculating tools, etc.
- Demonstration of key tools within Excel with an emphasis on functions that benefit wastewater operators including:
    - Graphing - Valuable in identifying trends
    - Conditional formatting - Valuable in identifying high, low, typical, etc. values within a data set
    - Sorting - Valuable in arranging similar information for further evaluation
    - Hyperlinking - Useful in organizing and accessing information

Thursday, October 19

Session K: Computer Application

Moderator: Troy Larson

Room – Lakes & Streams

10:55 AM to 11:45 AM – Excel and Word: Making Record Keeping Easier

Presenter(s): Greg Paul

Affiliation: Op2Myz, Inc.

We have a problem – How do we efficiently log and retrieve information relative to process changes we've made and keep track of the results of those changes? Right now you are tracking your operational changes using hand written logs and a variety electronic file, like scanned pdf, video, and photos. WWTP operators record this information then go back and search through it weeks, months and maybe years later in an effort to find a past experience. The amount of information which gets logged can be overwhelming. An operator can then spend way too much time looking through these records to find a specific event or piece of information. Find out how you can use Microsoft Excel to log, sort and retrieve memos, pdfs, video and photos with ease.

Thursday, October 19

Session L: Construction

Moderator: Jim Johnson

Room – Biosolids

10:00 AM to 10:50 AM – Public Construction

Presenter(s): Scott Schramm

Affiliation: Strategic Municipal Services, Inc.

A. **Background**. This workshop will use examples and case studies to discuss common problems, pitfalls and protection during public construction. We will summarize key Statute requirements, standard contract documents and case law that address bidding, contract award, owner procured equipment and Owner securities. **B**. **Challenges**. Public Owners should have a general understanding of:

1. contract defined roles / responsibilities
2. how to incorporate owner procured equipment
3. how to resolve conflicts
4. how to resolve defective / non-complying work
5. payment, bond and lien claims, retainage and project acceptance
6. types of "changes"
7. contract schedules, due dates and damages

C. **Strategic Solutions**. Contract Documents, Statutes, bonds, insurance and Case Law provide basic tools to support public owners. The important role of collaboration and maintaining respectful / collaborative relationships can streamline construction.

Thursday, October 19

Session L: Construction
Moderator: Jim Johnson
Room – Biosolids
10:55 AM to 11:45 AM – City of Rhinelander Downtown Reconstruction
Presenter(s): Mark Barden, Tim Kingman
Affiliation: Town & Country Engineering, Inc., City of Rhinelander

This presentation will address the planning, funding, design, construction and all of the interesting obstacles overcome throughout the City of Rhinelander Downtown Reconstruction Project.

Thursday, October 19

Session M: Nutrient Removal
Moderator: John Bond
Room: Clean Waters
1:30 PM to 2:15 PM – 25 Years of Biological Nutrient Removal and Clean Water
Presenter(s): Harry Mathos, Bill Marten
Affiliation: City of Beloit Water Resource Division, Donohue & Associates

The City of Beloit's aging treatment facilities, located in the heart of downtown Beloit, were being loaded at nearly double its rated capacity by the mid-1980s. The City implemented a long range facility plan which moved treatment to City-owned property located adjacent to its major industrial park, on the outskirts of the City. The new plant, designed for 2010 loads, included nitrifying activated sludge with anoxic selectors (a relatively new technology intended to overcome the old plant's constant battles with filamentous outbreaks) along with other advanced wastewater and odor control features.

The new facilities have now been operating for 25 years, providing the City reliable, effective and efficient wastewater treatment and allowing the City to grow and thrive. The new facilities actually performed better than anticipated, achieving biological phosphorus removal upon startup – allowing the City to comply with the first round of NR 217 limits with very minor modifications. However, this didn't mean it all came easy, as the plant was one of the first to experience struvite problems, which proved to be a great learning experience as well as an effective means to control sidestream loadings to the plant.

This presentation will provide a brief history of the City's situation, decision and planning process that led to the new plant, and will then highlight the plant's 25 years of operations, with a particular emphasis on nutrient removal, significant operational experiences (e.g., despite the new selectors, the plant experienced filamentous outbreaks early in its operation – and the resulting solution benefitted the entire wastewater industry in terms of understanding selector design and operation), and the benefits to the community and environment from the plant's underestimated capacity and outstanding treatment performance. We feel it's a great success story, and We're Still Going Strong!

Thursday, October 19

Session M: Nutrient Removal

Moderator: John Bond

Room: Clean Waters

2:20 PM to 3:05 PM – Nutrient Removal/Recovery

Presenter(s): Terry Robinson

Affiliation: CLEARAS Water Recovery

CLEARAS Water Recovery's next-generation wastewater treatment technology recovers nutrients sustainably, enabling facilities to capitalize on waste to value opportunities within their plant operations. This presentation will cover the basics of the core Advanced Biological Nutrient Recovery (ABNR^{TM}) technology platform and present an overview of data collected from the ongoing mobile pilot tour at various locations throughout Wisconsin in 2017. Additionally, the presentation will cover aspects of various biomass revenue opportunities resulting from the ABNR process, with examples of real client scenarios considered for initial full-scale implementations of the technology in the U.S.

Thursday, October 19

Session M: Nutrient Removal

Moderator: John Bond

Room: Clean Waters

3:15 PM to 4:00 PM – Optimization in Practice: Case Studies from NEW Water's Phosphorus and TSS Optimization Plans

Presenter(s): Bruce Bartel, Jake Becken, Nathan Cassity

Affiliation: NEW Water, NEW Water, Donohue & Associates

NEW Water, the brand of the Green Bay Metropolitan Sewerage District, is in the process of implementing optimization plans for phosphorus and suspended solids performance as described in an Operational Evaluation Report (OER) submitted to the Wisconsin DNR in spring of 2015. The optimization plans include a set of activities to be implemented over a three-year period that have the potential to reduce discharges of phosphorus and suspended solids from NEW Water's two treatment facilities. These activities include:

- Source reduction
- Data collection
- Process monitoring
- Minor facility modifications
- Operational adjustments
- Process control upgrades

This presentation will cover the approach and the outcomes of several optimization action items being implemented as part of NEW Water's OER optimization plan. The specific case studies and examples at NEW Water shared in this presentation will likely serve as useful examples for other facilities about to develop and pursue optimization plans. Highlighted items will include:

1. Clarifier field testing
2. EBPR Selector sizing modifications combined with aeration basin profile sampling
3. Phosphorus speciation data collection
4. Bench-scale chemical dosing study

Thursday, October 19

Session N: Resource Recovery Facility Operations

Moderator: Jeremy Cramer

Room: Lakes & Streams

1:30 PM to 2:15 PM – Return Activated Sludge – Why it Matters – How to Optimize

Presenter(s): Phillip Korth

Affiliation: Foth Infrastructure and Environment

Return activated sludge (RAS) is a critical part of the typical activated sludge system. However, the RAS rate is not critical to the control of the activated sludge process. The parameters of sludge age, food to mass ratio, and volumetric loading are typical design and operational parameters for activated sludge and are not dependent on RAS rate. Thus, RAS rate is often ignored with a set it and forget it strategy. In reality, RAS rate is critical for good clarifier operation, impacts sludge handling, energy costs, and can impact biological nutrient removal (BNR) operation.

This presentation will look in depth at RAS covering the following topics:

- Define what RAS is
- How to calculate RAS rate
  - Sludge Blanket Depth Control – sludge judge, sludge blanket detectors
  - Settleability – Formula using 30 minute settleability test with examples
  - SVI – Formula using SVI with examples
- Clarifier Operation –
  - Impact of solids loading on clarifier
  - Avoiding clarifier failure
- Energy Impact – pumping rates and typical energy cost impact. Cost savings will be shown for lower RAS pumping rates.
- Sludge Handling Impact – If WAS is taken from RAS, then the concentration of solids in the RAS will have a significant impact on sludge handling. Low TSS in the RAS will lead to higher decanting, reduced tank capacity, greater side stream impact.
- RAS Pumping – types of pumps, range of flows, impact of low head pumping applications, control strategies, flow meter placement, constant or intermittent pumping.
- Where to discharge RAS? – flexibility can be useful for biological nutrient removal and high flow storm events
- What is in your RAS? – can contain nitrates, chemical phosphates – these can impact operation
- Using RAS and chlorine for filamentous control

Thursday, October 19

Session N: Resource Recovery Facility Operations

Moderator: Jeremy Cramer

Room: Lakes & Streams

2:20 PM to 3:05 PM – Utilizing Excess Facility Capacity

Presenter(s): Chris Lefebvre

Affiliation: City of Stevens Point

Most municipal treatment facilities are sized to be able to handle their estimated loadings twenty years after construction. This excess capacity often goes underutilized. With land spreading regulations becoming more stringent many waste haulers throughout the state are looking to wastewater treatment facilities to handle the burden of treating these wastes. This trend gives business minded utilities the opportunity to increase revenue by utilizing their excess capacity. The City of Stevens Point has been aggressively taking advantage of this opportunity since 2011. This presentation will give an overview of Stevens Point's hauled in waste program as well as the positives and negatives of accepting outside wastes.

Thursday, October 19

Session N: Resource Recovery Facility Operations

Moderator: Jeremy Cramer

Room: Lakes & Streams

3:15 PM to 4:00 PM – How Drones Streamline and Enhance Wastewater Planning and Design

Presenter(s): Pat Morrow

Affiliation: MSA Professional Services

Unmanned Aerial Vehicles (UAVs), a.k.a "drones" have gained in popularity over the past few years spanning applications ranging from surveillance to recreation. This presentation will cover the advantages and real-world applications for using drones for wastewater planning and design. High quality site topography and aerial photography can be obtained during the planning and design phases of wastewater upgrades – ensuring that no surface features are missed. The ability to pinpoint all features on a site or utility corridor and develop accurate quantities – even during the planning phase – are some examples. For watershed compliance projects such as Water Quality Trading or Adaptive Management, drones provide capabilities to obtain critical (and time saving) documentation necessary for technology selection and design of best management practices (BMPs) aimed at reducing nonpoint phosphorus loads. Identification of streambank erosion, gully erosion in farm fields, accurate surveys of farmsteads scheduled for improvements, and photos of pre- and post-BMP implementation are just some examples of applications. We will also have one of our drones on-site for viewing and possible demonstration.

Thursday, October 19

Session O: Poop-er-ee

Moderator: Sharon Thieszen

Room: Biosolids

1:30 PM to 2:15 PM – Are the Operators Helping the Students or Vice Versa?

Presenter: Douglass Nelson

Affiliation: Milwaukee School of Engineering

MSOE has had a long history of serving the community and industry by partnering on real-life projects. Mechanical Engineering Students partner with local industrial facilities, Architectural Engineering students and Construction Management students partner with building developers, and Software Engineering students work with software development companies.

When MSOE's Civil Engineering program was started, this tradition was continued. Students have worked on real-life projects such as Phosphorus removal systems and Biogas reuse systems for local Wastewater treatment plants. These projects teach the real-life conditions for such projects and the client gets a project completed that may not have been done otherwise.

This presentation reviews the advantages and limitations of these types of classroom delivery and project completion.

Thursday, October 19

Session: O Poop-er-ee

Moderator: Sharon Thieszen

Room: Biosolids

2:20 PM to 4:00 PM – Tricks of the Trade

Presenter: Sharon Thieszen, Tom Steinbach, Troy Larson

Affiliation: NEW Water, Regional Oconomowoc Wastewater Utility, Strand Associates

Our state is one of the leaders in our industry, and our lakes, rivers, and streams are testimony to the hard work and effort put forth by our WW operators, technicians, and managers. To do the work we do, many innovations have been developed on the job and in the trenches. During this session, treatment plant and collection system personnel will present their "tricks of the trade" experiences related to wastewater collection and treatment. Presentations will include ideas, methods, fixes, strategies, and/or management practices that have been successfully implemented at wastewater utilities or private treatment works across the state.

Thursday, October 19

Session P: Septage Compliance and Master Operator Training

Moderator: Steve Geis

Room: Woods & Meadows

12:30 PM to 4:30 PM – Septage Compliance and Master Operator Training

Presenter: Fred Hegeman

Affiliation: Wisconsin Department of Natural Resources

This class provides an overview of the regulatory requirements for becoming an Operator-in-Charge for a septage business. It fulfills the requirements for applying to become a Master Operator. The class includes:

- Differences between the many certifications and a business license, and details the associated requirements for all.
- Similarities and differences between a Master Operator and an Operator-in-Charge
- The department's 3-legged stool perspective involving compliance, education and enforcement.
- Differences and similarities between the state and federal septage programs.
- A background to achieving compliance using stepped enforcement.
- Detailing servicing requirements including the daily logging requirements as well as providing the basis for county maintenance programs.
- The background and the many details associated with properly operating a land application system for beneficial use of septage waste.

The class provides useful information for both the new and experienced operator to better understand the septage regulations necessary for operating a compliant septage business.

WWOA TECHNICAL PROGRAM SCHEDULE *Friday, October 20, 2017* CECs: 1.0 General Septage, 1.0 Wastewater, 1.0 hr. Municipal Waterworks
Operators Farewell Breakfast – Marriott Conference Center – Aliquot Room 8:30 a.m. – 10:30 a.m. Scan In & Scan Out at the Conference Registration Conference Center Office Moderator: WWOA President Jeff Bratz Presenter: Greg Paul *The Gut Bug Connection*
Conference Concluded

Friday, October 20

Operators Farewell Breakfast

Moderator: Jeff Bratz

Room: Conference Center – Aliquot Room

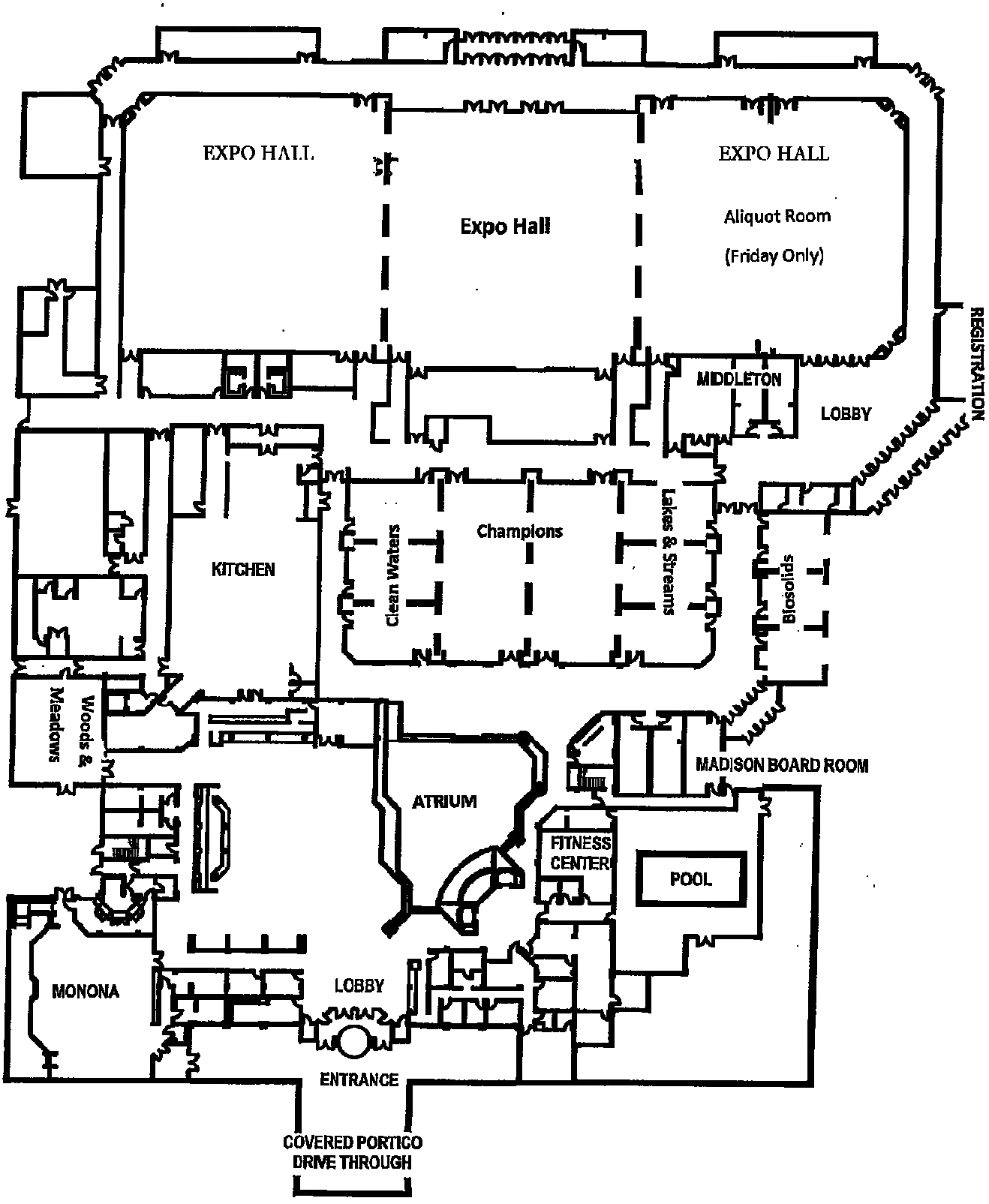
8:30 AM to 10:30 AM – The Gut Bug Connection

Presenter: Greg Paul

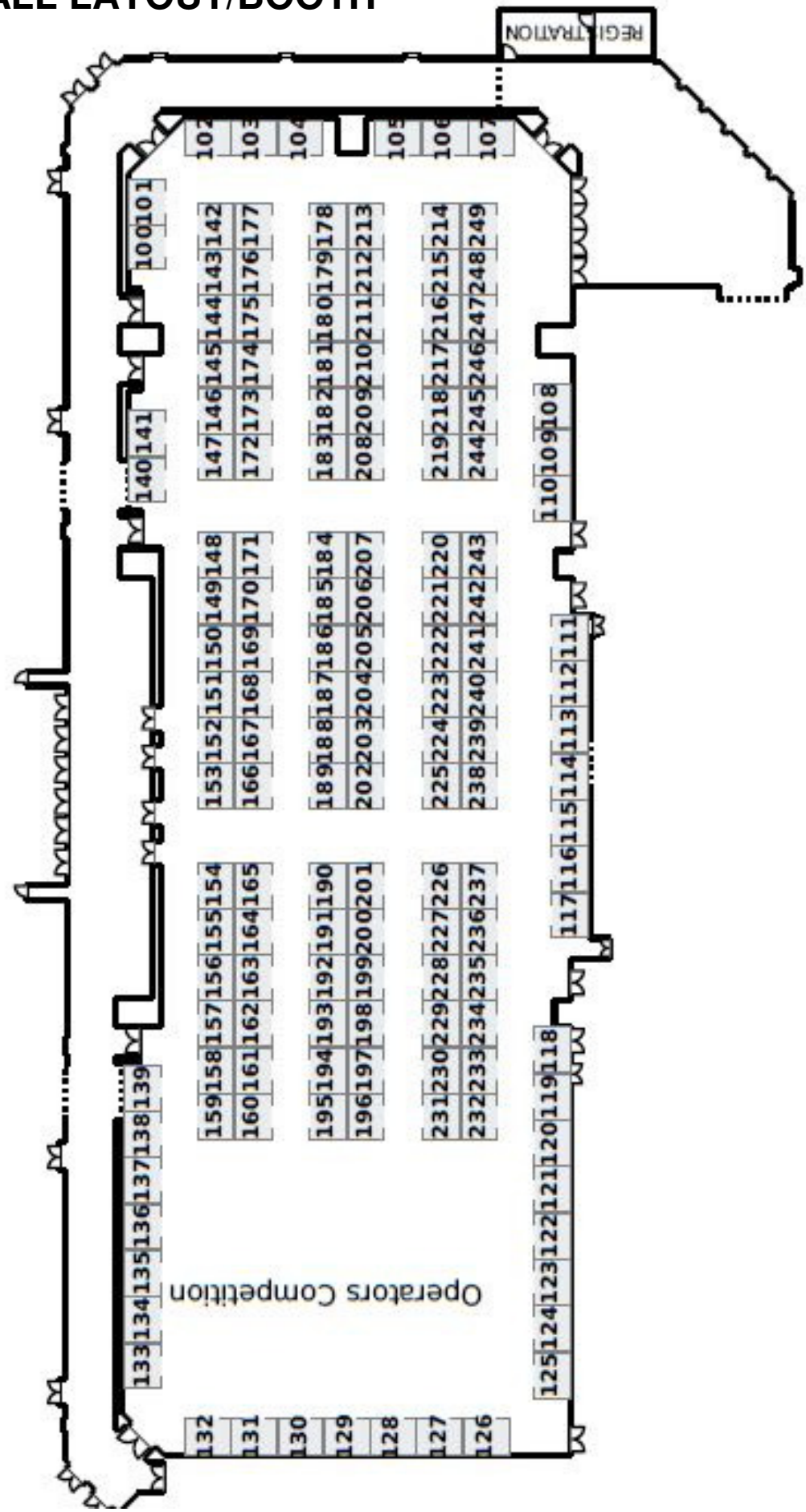
Affiliation: Op2Myz, Inc.

Recent advances in DNA sequencing and scientific research is shining a light on the human digestive track, specifically what is called the human microbiome. Discoveries are showing both physical and mental health are tied to the type of microbes that are growing in the digestive track. Research is also uncovering evidence the human microbial population can be manipulated to produce desired outcomes, preventing and curing physical and mental illness. We in wastewater treatment understand this concept better than others. We have been manipulating human (waste) microbes for years to produce beneficial outcomes, clean water and stabilized biosolids. Finish up your 51st WWOA Conference experience learning how we can improve our personal lives using familiar wastewater operating principles, theories and practices.

CONFERENCE FACILITY LAYOUT/ROOM LOCATIONS



EXPO HALL LAYOUT/BOOTH



Booth #	Company
152	4RF USA Inc.
154	Advanced Drainage Systems
225	Adaptor Inc.
153	AECOM
125	Aerzen
143	AgSource Laboratories
179	Altronex
236	Anixter
159	Applied Technologies Inc. (ATI)
122	Aquafix, Inc
170	B & M Technical Service, Inc.
171	B & M Technical Services, Inc.
135	Badger Laboratories & Engineering
190	Baxter & Woodman, Inc.
185	Berg-Johnson
134	Biolynceus
129	Boerger, LLC
148	BRUCE MUNICIPAL EQUIPMENT
141	ByTec Resource Management
237	Cady Aquastore Inc.
118	Cardinal Environmental
213	Cedar Corp
222	CHEMTRADE
223	CHEMTRADE
142	Clark Dietz, Inc.
132	Clearas
105	COMMERCIAL TESTING LABORATORY
234	Conney Safety Products
200	Crane Engineering
201	Crane Engineering
169	Cretex Specialty Products
218	CUES
241	Dixon Engineering
102	Dorner Company
103	Dorner Company
104	Dorner Company
203	Drydon Equipment, Inc.
204	Drydon Equipment, Inc.
166	Energenecs
167	Energenecs
168	Energenecs
151	Environmental / Health Products & Service
188	Environmental Dynamics International

Booth #	Company
224	Envirotech Equipment Co.
246	Ess Brothers and Sons, Inc.
115	Evoqua
119	Fabick Cat
100	FabTech WWS/Envirotech Gates
184	Ferguson Waterworks
160	Fiberglass Solutions, Inc.
106	Focus on Energy
108	General Engineering Company
164	GREAT NORTHERN ENVIRONMENTAL
181	Hardy Pro-Air Systems and Services
111	Harrington Industrial Plastics
112	Hawkins Inc.
221	HD Supply Waterworks
157	Howard Grote & Sons, Inc.
138	Hydrite Chemical
199	Hydro-Klean
242	ICS Group
163	IDEXX Laboratories,Inc.
231	INTEGRATED PROCESS SOLUTIONS
165	J. F. Ahern Co.
120	JMB & Associates
121	JMB & Associates
208	Kemira
244	Kuhn North America
156	L&S Electric
177	L.W. Allen
209	LAI Ltd
226	Martelle Water Treatment
193	Marshall Bond
220	McMAHON
180	Midwest Meter, Inc.
205	Monroe Truck Equipment, Inc.
155	MSA - The Safety Company
147	MSA Professional Services
130	Mulcahy Shaw Water
131	Mulcahy Shaw Water
133	Mulcahy Shaw Water
127	Neo Chemicals & Oxides
210	Nexom
247	NORTH CENTRAL LABS
150	North Shore Environmental Construction Inc.
186	Northern Lake Service
161	Northern Pipe Inc.

Booth #	Company
191	Northern Sewer Equipment Co
178	Pace Analytical
162	P.J. Kortens and Company, Inc.
116	Peterson and Matz, Inc.
117	Peterson and Matz, Inc.
137	PPG Protective & Marine Coatings
158	Process Equipment Repair Systems
212	Public Works Sales Holding
219	Pumping Solutions, Inc.
192	Quality Flow Systems, Inc
144	RDM Municipal
145	RDM Municipal
196	Robert E. Lee & Associates, Inc.
174	RootX
202	Ruekert & Mielke, Inc.
217	Safe-Fast, Inc.
114	Schwing Bioset, Inc.
211	Sealing Systems Inc.
243	Short Elliot Hendrickson (SEH)
187	Smith & Loveless
207	Spectrum Contracting Corporation
146	Staab Construction
140	Starnet Technologies
195	Strand Associates
197	SUBURBAN LABORATORIES
101	SUEZ Advanced Solutions
232	Symbiont
227	Synergy Sales
228	Synergy Sales
240	The Expediters Inc.
238	The Probst Group
245	Thermo Fisher Scientific
107	Town & Country Engineering, Inc.
109	Tri-State Pump & Control Inc
110	Tri-State Pump & Control Inc
126	Trojan UV
206	UEMSI / HTV, Inc.
189	Unison Solutions, Inc.
194	United Laboratories, Inc.
230	USA Blue Book
198	USCC
175	USEMCO
176	USEMCO
235	Vacuum Pump and Compressors

Booth #	Company
229	VEGA Americas
113	Veolia/Kruger
149	Visu-Sewer Inc.
233	Vogelsang
172	William Reid
173	William Reid
182	William Reid
183	William Reid
136	WONDERWARE MIDWEST
128	Xylem Analytics/YSI
123	Xylem Flygt
124	Xylem Water Solutions
239	Zoeller Pump Company

MEETING ROOM KEY

CONFERENCE CENTER

Marriott Name	WWOA Name
Superior	EXPO HALL
Michigan	EXPO HALL
Wisconsin	EXPO HALL
Mendota	EXPO HALL
Geneva	EXPO HALL
WI/Mendota/Geneva	Aliquot Room (Friday only)

MARRIOTT MEETING ROOMS

Marriott Name	WWOA Name
Lacrosse	Biosolids
Milwaukee	Biosolids
Green Bay	Biosolids
Salons F/G/H	Lakes & Streams
Salon D/E	Champions Ballroom
Salon A/B/C	Clean Waters
Greenway	Woods & Meadows