Welcome to the 92nd Annual Meeting of the Central States Water Environment Association

WISCONSIN | MINNESOTA | ILLINOIS

92ND ANNUAL MEETING
MAY 14-16, 2019 | MONONA TERRACE, MADISON, WISCONSIN

Transitioning to a New Generation

Earn up to 12 CEUs/14 PDHs

DOWNLOAD the CSWEA's 92nd Annual Meeting App

DAILY PLANNER
Welcome to the 92nd Annual Meeting

The Local Planning Committee is excited about CSWEA’s 92nd Annual Meeting at the Monona Terrace in beautiful Madison, WI. Our theme this year is *Transitioning to a New Generation*, which focuses on getting Young Professionals even more engaged in our industry. We have been working hard to provide a great annual meeting to build technical knowledge, provide networking opportunities, conduct Section and Association business and provide time for our members to reconnect with friends.

The Annual Meeting starts on the Tuesday with golf; a service project with Yahara WINs; and concurrent tours of storm water features at the UW-Madison Arboretum, Lake Wingra, and the Nine Springs Wastewater Treatment Plant. New this year, the stormwater tour will be done on bicycles (weather permitting). In the late afternoon, there are meetings for the 7S Society, Young Professionals, Golden Manhole Society, and Global Water Stewardship groups. Finally, the day concludes with our social event at the Madison Children’s Museum.

Wednesday starts with a 5k fun run and yoga, before transitioning into technical sessions and the exhibition. This year, we have a couple time periods reserved for ‘exhibition only’. The technical sessions include a segment on soft skills and leadership, which will be valuable to young and seasoned professionals alike. During this time, a cross-generational panel discussion will take place where members can share how their careers have evolved and developed. We will recognize outstanding members who do great things every day to support the water environment and our Association on Wednesday evening during the awards reception.

The State Section breakfast kicks off activities on Thursday, followed by technical sessions and the exhibition. There are four hands-on operator focused technical sessions planned for Thursday morning. The Association Meeting and Luncheon will take place at mid-day. The Annual Meeting concludes with technical session in the afternoon including ethics presentations.

Thanks to all who have worked for this Annual Meeting focused on *Transitioning to a New Generation*. We look forward to seeing you in May!

**CEUs & PDHs**

Wastewater Operators – Sessions have been approved for Continuing Education Credits. Please sign in at the registration desk.

Professional Engineers – Please keep track of the sessions you attend and hold on to this planner.

1 PDH = 50 minutes of session attendance.
# Conference at a Glance

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<th>TUESDAY MAY 14</th>
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<td>10:00 - 3:00 Golf Outing</td>
<td>Yahara Hills Golf Course</td>
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<td>1:00 - 4:00 YP Service Project</td>
<td>Capital Springs State Recreation Area</td>
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<tr>
<td>12:30 - 3:45 Stormwater Tour</td>
<td>UW-Madison Arboretum and Lake Wingra</td>
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<td>2:00 - 4:00 Plant Tour</td>
<td>Madison MSD - Nine Springs WWTP</td>
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<td>4:00 - 5:30 Tours Meet-up at Brewery</td>
<td>Great Dane (Downtown)</td>
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<td>4:30 - 5:00 7S Meeting</td>
<td>Monona Terrace</td>
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<td>5:00 - 5:30 Golden Manhole Society</td>
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<td>5:15 - 6:00 Global Water Stewardship Annual Meeting</td>
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<td>Meeting Room P</td>
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<tr>
<td>6:30 - 10:30 Social/Meet &amp; Greet</td>
<td>Madison Children’s Museum</td>
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<td>6:30 - 8:00 5k Run/Walk</td>
<td>Lake Monona Bike Path</td>
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<td>7:00 - 8:00 Sunrise Yoga</td>
<td>Hilton Madison Monona Terrace</td>
<td>LaFollette</td>
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<td>8:00 - 6:00 Exhibits</td>
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<td>Ballroom ABCD</td>
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<td>8:30 - 9:30 Technical Sessions</td>
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<td>Hall of Ideas EFGHIJ</td>
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<td>9:30 - 10:00 Morning Break</td>
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<tr>
<td>7:00 - 8:30 State Section Business Meetings</td>
<td>Monona Terrace</td>
<td>Meeting Rooms K-R</td>
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<tr>
<td>10:00 - 5:00 Tuesday May 14</td>
<td>Hilton Madison Monona Terrace</td>
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Yahara Hills offers a 36-hole regulation golf course spread over 400 acres of rolling hillside. Both 18-hole courses feature large bunkered greens, well-placed hazards and beautiful water features. The 2019 golf event fee includes greens fee, cart, lunch, courtesy gift, along with a chance at many skill prizes. Registration begins at 9:00 am with a shotgun start at 10:00 am.

For corporate sponsorship opportunities or for outing details, contact Marc Zimmerman, Golf Outing Coordinator, by phone (608-373-3461) or by e-mail at zimmermannm@ci.janesville.wi.us.

COMMUNITY SERVICE PROJECT
Capital Springs State Recreation Area
1:00 to 4:00 pm

Volunteer to work with other CSWEA volunteers at Madison Metropolitan Sewerage District’s restored wetlands and lagoons, which is part of the Yahara WINs program. The lagoons and wetlands are part of the Capital Springs State Recreation Area.

For more information about this year’s project, contact Jillian Kiss by phone at 630-587-0470 or by e-mail at j.kiss@trotter-inc.com.

CITY OF MADISON STORMWATER TOUR
Stormwater Facilities Protecting the UW-Madison Arboretum and Lake Wingra
12:30 to 3:45 pm

Please join us as the Wisconsin Section Watershed and Stormwater Committee will be hosting a bike tour around Lake Wingra to visit eight stormwater treatment facilities providing stormwater treatment to protect Lake Wingra and the UW-Madison Arboretum. Lake Wingra is a 339-acre lake in the City of Madison with a 5.68 square mile highly urbanized watershed surrounded by the UW-Madison Arboretum, Vilas Park, and Edgewood College lands. The story of rehabilitation, restoration and stormwater treatment will unfold as you participate in a gentle 9.2-mile bike ride (with some modest hills), looping around the lake.

This tour will include:
• Lake Wingra Dam with viewing deck (Might see a Muskie jump).
• Wingra Park Coanda Screen Stormwater Treatment Device.
• Monroe Street Wet Pond Rehabilitation and Alum Pilot Project.
• Manitou Pond Wet Pond and Natural Channel Restoration.
• Nakoma Park Stream Restoration.
• Pond 3 Wet Pond and Upstream Coanda Screen Stormwater Treatment device.
• Pond 4 Wet Pond Rehabilitation.
• Wingra Creek Streambank Restoration.

The bikes (3-speed) will be rented through Madison B-Cycle (www.madison.bcycle.com) or attendees can bring their own bikes. Please indicate on registration form if you are bringing your own bike. After the tour, attendees are invited to visit a local brewpub for a beverage before returning to their lodging accommodations.

Tour Logistics: Attendees will drive vehicles from the conference site to parking lots with 3-hour parking in Vilas Park near the B-Cycle Rental Station at the corner of Vilas Park Drive and N. Wingra Drive (map provided at registration). Walk to the B-Cycle Rental station, which is where the tour will start and end. Afterwards, attendees will drive vehicles to a local brewpub. Carpooling is encouraged. In the event of inclement weather, the tour will either consist of a vehicle tour of the sites or a presentation at the conference site.

Please contact Jon Lindert by phone at 608-251-4843 x1191 or by email at jon.lindert@strand.com with questions or for more tour details.

PLANT TOUR
Nine Springs Treatment Facility
3398, 1610 Moorland Rd, Madison, WI 53713
2:00 to 4:00 pm

The Nine Springs Treatment Facility is a 42 MGD activated sludge treatment facility serving the City of Madison and the surrounding suburbs. The tour will consist of seeing the new state-of-the-art nutrient recovery system; its Platinum LEED certified plant additions; the siloxane scrubbing and mesophilic digestion systems; and include a progress update on their new interpretive public relations/museum building. The facility is a five-minute drive from the Monona Terrace Conference Center.

After the tour, attendees will gather at the downtown Great Dane Pub & Brewing Company. Carpooling is encouraged.
**TUESDAY NIGHT SOCIAL**

Madison Children’s Museum (100 N Hamilton St)
6:30 pm to 10:30 pm

By day, Madison Children’s Museum offers creative play and discovery-learning for children and families. By night, they host many grown-up events, including ours! Join us for the annual social event where, if you’d like, you get to tap your inner child. Start on the rooftop garden and visit the museum’s animal friends, with gorgeous views of the Capitol and Lake Mendota. Then move inside for appetizers, drinking, socializing, games and fun - whatever your playful heart desires. There’s something for every kid and kid at heart! Join us from 6:30 to 10:30 pm. The Madison Children’s Museum is just a short walk from the Hilton.

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**Wednesday, May 15, 2019**

**5K RUN/WALK**
Lake Monona Bike Path
6:30 to 8:00 am

Participants are asked to meet at the starting line for a 6:30 am start. Directions will be provided at registration and via e-mail.

**SUNRISE YOGA**
Hilton Madison, LaFollette Room
7:00 to 8:00 am

Attendees are welcome to join a Sunrise yoga session. Whether you are an absolute beginner or an experienced yogi, you will benefit physically and mentally from an hour of yoga focused on preparing you for the day ahead. An instructor from Dragonfly Hot Yoga will lead the session. Note that this will not be a ‘hot’ yoga class. Bring your own mat or borrow one.

**TECHNICAL SESSIONS**
Monona Terrace Hall of Ideas EFGHIJ
8:30 to 9:30, 10:00 to 11:00 am, 1:30 to 2:30 pm, and 3:30 to 4:30 pm

There will be four concurrent half-hour sessions A, B, C, and D are from 8:30 to 9:30 and 10:00 to 11:00 am. There will be four afternoon concurrent half-hour sessions E, F, G, and H from 1:30 to 2:30 and 3:30 to 4:30 pm. For more information, please see the Technical Program.

**EXHIBITS**
Monona Terrace Ballroom
8:00 am to 6:00 pm

Exhibits showcasing the latest technology in wastewater, collection systems, treatment and many related items will be on display. Be sure to visit our fine exhibitors and thank them for their support of our Association.

**EXHIBITOR LUNCH**
Monona Terrace Ballroom
12:00 to 1:30 pm

The Exhibitor Lunch offers exhibitors and conference attendees a time to meet in a relaxing and social environment. Please visit the Exhibit Hall where the Exhibitor Lunch will be held.

**POSTER SESSION I**
Monona Terrace Ballroom
2:30 to 3:30 pm

Posters will be on display in the Exhibit Hall. Presenters will be available at their posters at this time to discuss their posters and answer questions. Please stop and visit.

**EXHIBITOR RECEPTION**
Monona Terrace Ballroom
4:30 to 6:00 pm

Light snacks and refreshments will be provided in the Exhibit Hall. Share some refreshments and visit with our exhibitors, and thank them for attending this year’s Annual Meeting.

**CSWEA ANNUAL BUSINESS MEETING**
Monona Terrace Hall of Ideas EFGHIJ
5:00 to 6:00 pm

The Association Business Meeting will include reports from the Association Committees and Sections and the annual election of officers. We encourage everyone to attend and learn about our association’s activities.
CSWEA’S 92ND ANNUAL MEETING

CSWEA ANNUAL AWARDS EVENT
Monona Terrace Grand Terrace
6:30 to 9:00 pm

6:30 to 7:00 pm – Social Reception. Connect with friends and enjoy refreshments before the Awards Banquet.
7:00 to 9:00 pm – Awards Presentations. Hear updates about CSWEA activities from the outgoing president, the vision for the year ahead from our incoming president and honor this year’s award winners for the many WEF and CSWEA Awards presented to the very best of our industry.

The Annual CSWEA Awards Event is a ticketed event and includes a meal. Please remember to purchase a ticket and bring the ticket to the event.

Thursday, May 16, 2019

STATE SECTION BUSINESS MEETINGS
Monona Terrace Meeting Rooms K-R
7:00 to 8:30 am

Please attend your respective State Section’s business meeting to be updated on the activities of the Section and its committees. Don’t miss this opportunity to get involved and find out where you can help your Section.

This is a ticketed event and includes a meal. Please remember to purchase and bring your ticket with you.

EXHIBITS
Monona Terrace Ballroom
8:00 to 12:00 pm

Exhibits showcasing the latest technology in wastewater, collection systems, treatment and many related items will be on display. Be sure to visit our fine exhibitors and thank them for their support of our Association.

TECHNICAL SESSIONS
Monona Terrace Hall of Ideas EFGHIJ
8:30 to 9:30, 10:00 to 11:00 am, 1:30 to 2:30 pm, and 3:00 to 4:00 pm

There will be four concurrent half-hour technical sessions K, L, M, and N from 8:30 to 9:30 and 10:00 to 11:00 am. There will be four afternoon concurrent half-hour technical sessions P, Q, R, and S from 1:30 to 2:30 and 3:30 to 4:30 pm. There will also be an Operations Track in the morning, and ethics topics in the afternoon (PE requirement in some states). For more information, please see the Technical Program.

POSTER SESSION II
Monona Terrace Ballroom
9:30 to 10:00 am

Posters will be on display in the Exhibit Hall. Presenters will be available at their posters at this time to discuss their posters and answer questions. Please stop and visit.

SILENT AUCTION
Exhibit Hall/Registration Area

Auction items donated by exhibitors to benefit the Global Water Stewardship will be displayed in the Exhibit Hall. Support this amazing social and humanitarian effort by donating or bidding on the items. Interested in donating an item? Contact Tom Mulcahy at tmulcahy@mulcahyshaw.com for more information. Bids will be posted at 11:30 am on Thursday, May 16 in the Exhibit Hall.

ANNUAL CSWEA ASSOCIATION MEETING
Monona Terrace Grand Terrace
12:00 to 1:30 pm

Hear from our President and WEF Visitor as they present a summary of activities and initiatives of the organizations. We will recognize our Operations Challenge teams for their performance at WEFTEC 2018 and our newest inductees to the Golden Manhole Society and the 7S will be announced and honored.

This is a ticketed event and includes a meal. Please remember to purchase and bring your ticket with you.
Featured Events

TUESDAY NIGHT SOCIAL
Madison Children’s Museum (100 N Hamilton Street)
6:30 to 10:30 pm | Tuesday

By day, Madison Children’s Museum offers creative play and discovery-learning for children and families. By night, they host many grown-up events, including ours! Join us for the annual social event where, if you’d like, you get to tap your inner child. Start on the rooftop garden and visit the museum’s animal friends, with gorgeous views of the Capitol and Lake Mendota. Then move inside for appetizers, drinking, socializing, games and fun – whatever your playful heart desires. There’s something for every kid and kid at heart! Join us from 6:30 to 10:30 pm. The Madison Children’s Museum is just a short walk from the Hilton.

GOLF OUTING
Yahara Hills Golf Course
6701 Hwy 12 & 18 East Madison, WI 53718
10:00 am to 3:00 pm

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5K RUN/WALK
Lake Monona Bike Path
6:30 to 8:00 am

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Featured Events

CITY OF MADISON STORMWATER TOUR
Stormwater Facilities Protecting the UW-Madison Arboretum and Lake Wingra
12:30 to 3:45 pm | Tuesday

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Please contact Jon Lindert by phone at 608-251-4843 x1191 or by email at jon.lindert@strand.com with questions or for more tour details.

SERVICE PROJECT
Capital Springs State Recreation Area
Madison, WI
1:00 to 4:00 pm

Volunteer to work with other CSWEA members for an enriching experience at the Metropolitan Sewerage District’s restored wetlands and lagoons, a short drive from Monona Terrace. The lagoons and wetlands – part of the Capital Springs State Recreation Area – provide habitat for a variety of birds and wildlife. With the help of District staff, volunteers will identify and remove invasive species as an effort to enhance a unique and valuable resource. Volunteers will meet at Monona Terrace and carpool to the site. Volunteers are asked to wear boots and dress appropriately for the weather. Work gloves and safety glasses will be provided. Afterwards, volunteers are welcome to meet-up and socialize with Stormwater Tour and Plant Tour participants at the Great Dane Pub and Brewing Company (123 E Doty St, Madison).

For more information about this year’s service project, contact Jillian Kiss at j.kiss@trotter-inc.com.

SILENT AUCTION
Exhibit Hall/Registration Area

Auction items donated by exhibitors to benefit the Global Water Stewardship will be displayed in the Exhibit Hall. Support this amazing social and humanitarian effort by donating or bidding on the items. Interested in donating an item? Contact Tom Mulcahy at tmulcahy@mulcahyshaw.com for more information. Bids are due by 11:30 am Thursday. Winners will be posted in the Exhibit Hall at 11:30 am Thursday.
PLANT TOUR
Nine Springs Treatment Facility
1610 Moorland Rd, Madison, WI 53713
2:00 to 4:00 pm

The Nine Springs Treatment Facility is a 42 MGD activated sludge treatment facility serving the City of Madison and the surrounding suburbs. The tour will consist of seeing the new state-of-the-art nutrient recovery system; its Platinum LEED certified plant additions; the siloxane scrubbing and mesophilic digestion systems; and include a progress update on their new interpretive public relations/museum building. The facility is a five-minute drive from the Monona Terrace Conference Center.

After the tour, attendees will gather at the downtown Great Dane Pub & Brewing Company. Carpooling is encouraged.

Poster Program

WEDNESDAY MAY 15, 2019

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<th>2:30 - 3:30</th>
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<tr>
<td>Creating Efficiencies Using Mobile GIS and Operational Dashboards for Wastewater Systems</td>
<td>Reduce Sanitary Sewer Overflows (SSO) Problems: A Lesson in Public Relations and Community Buy-In</td>
<td>Otsego Aerobic Digestion Expansion and Optimization</td>
<td>Process Controls; Reach Beyond Equipment Automation with Industry 4.0 Solutions</td>
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<td>Kyle Engelking Symbiont</td>
<td>Thomas E. Nagle Robinson Engineering, Ltd.</td>
<td>Scott Schaefer AE2S</td>
<td>Randall Chann Environmental Dynamics International</td>
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<td>Oh, The Places You Can Go, with Apologies to Dr. Seuss.</td>
<td>Removing Grit from Primary Sludge at the Evansville Water and Sewer Utility East WWTP</td>
<td>Mathematical Modeling: A Resource to Assess the Capacity of Existing WRRFs to Meet New Treatment Objectives.</td>
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<td>Douglas Nelson Milwaukee School of Engineering</td>
<td>Tom Foley Clark Dietz</td>
<td>Bulbul Ahmed Stanley Consultants, Inc.</td>
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THURSDAY MAY 16, 2019

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<td>Leveraging Organizational Governance to Optimize PCS Software Upgrade Process</td>
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<td>Laurie Dunn Madison Metropolitan Sewerage District</td>
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Continuing with the conference theme of Transitioning to a New Generation and WEF’s reGeneration, we will have opportunities for job seekers and employers to connect throughout the conference. Building a strong water workforce is something important today and in the future. All who are interested in meeting new candidates, looking for career growth, or learning about opportunities should participate. There are many ways to participate:

- Stop by a participating vendor booth marked with a balloon to learn about their internship and career opportunities.
- Attend the Career Networking Meetup on Wednesday to socialize.
- Strike up a conversation with someone with a student ribbon on his or her nametag.
- Invite students or others seeking new opportunities to attend the conference.

Please help keep our water sector strong. We encourage you to participate in this great opportunity to inspire, engage, and recruit the next generation of water professionals! If anyone has any questions about participating, please reach out to Rachel Lee at rlee@ostara.com.

### Moderator List

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<th>SESSION</th>
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Transitioning to a New Generation

Conference Map & Floor Plan

LEVE L 4 - MEET ING R O O M S / GRAND TERRACE

PLANT TOUR
Nine Springs Treatment Facility
1610 Moorland Rd
2:00 to 4:00 pm

MONONA TERRACE
1 John Nolen Dr, Madison, WI

TUESDAY NIGHT SOCIAL
Madison Children’s Museum
100 N Hamilton St
6:30 pm to 10:30 pm

STORMWATER TOUR
UW-Madison Arboretum and Lake Wingra
12:30 to 3:45 pm | Tuesday

LAKE MONONA

LAKE WINGRA

MONONA BAY

TOWN OF MADISON
## Technical Program

### Wednesday, May 15, 2019

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<tr>
<td>8:30-9:00 From Lime Stabilization to THP, what you need to know before you build</td>
<td>Newly Developed Cloth Media for Low Phosphorus and Reuse Applications and Practical Testing Methods</td>
<td>The Selection of Advanced Biological Nutrient Recovery (ABNRTM) for Phosphorus Compliance at Two Wisconsin Facilities</td>
<td>An Ounce of Prevention is Worth a Pound (at Least!) of Cure: How MMSD is Reducing Flood Risk through the Greensseams® Program and Traditional Flood Management Techniques</td>
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<td>9:00-9:30 Reduced lag time and archael community shift after bioaugmenting anaerobic co-digesters fed poly-hydroxybutyrate bioplastic Nicholas Benn, Marquette University</td>
<td>WWTP Effluent Phosphorus Filtration for Point-Of-Seven-Five</td>
<td>Going Green: Clearas ABNR Bench Testing</td>
<td>Testing, Design and Full-Scale Operation of the First Installed File Cloth-Media Dish Filters for Combined Tertiary &amp; Wet Weather Treatment</td>
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<td>9:30-10:00 Morning Break</td>
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<td>10:00-10:30 Drying and Storing Methanogens for Standard Testing and Bioaugmentation</td>
<td>Innovative Approaches to Phosphorus Compliance in Wisconsin</td>
<td>Quantitative statistical assessment of microalgae models to optimize model structure and promote inclusion in water resource recovery facilities (WRRFs)</td>
<td>Public Partnerships, Permits, &amp; a Parking Lot: Underground-Detention in Glenview</td>
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<td>Matt Clauchants, Wisconsin</td>
<td>Brian Shoener, University of Illinois – Urbana &amp; Champaign</td>
<td>Matthew J. Moffitt, Baxter &amp; Woodman</td>
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<td>Room # F</td>
<td>Department of Natural Resources</td>
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<td>Elmhurst, Illinois – The Town that Addressed Residential Storm Water Flooding</td>
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<tr>
<td>10:30-11:00 Investigating acid phase co-digestion for medium-chain fatty acid production at a municipal wastewater treatment plant</td>
<td>DNA Technology to Optimize Biological Phosphorus Removal</td>
<td>Going Green: Clearas ABNR Bench Testing</td>
<td>Paul Burris &amp; Kent Johnson, City of Elmhurst</td>
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<td>Matt Seib, Madison Metropolitan Sewerage District</td>
<td>Trevor Ghylin, Eneregen/Microbe Detectives</td>
<td>kim Murdoch-Timmerman, Unison Solutions, Inc.</td>
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<td>11:00-12:00 Exhibit Hall Hour</td>
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<td>12:00-1:30 Lunch (Ballroom ABCD)</td>
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<td>1:30-4:30 PM Session F: Digestion &amp; Biosolids</td>
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<td>Session H: Smorgasbord: Algae, Biogas, &amp; Disinfection</td>
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<td>Room # EH</td>
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<tr>
<td>1:30-2:00 Enhancing the marketability of biosolids via thermal drying and palletization, challenges and lessons learned</td>
<td>Accomplishments in the Silver Creek Adaptive Management and NEW Water’s Plan for Full Scale Adaptive Management</td>
<td>Understanding Design Standards and Codes for Biogas Systems</td>
<td>Cultivating Emotional Intelligence and Leadership Style</td>
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<td>Sudhakar Viswanathan, Veolia</td>
<td>Brent Brown, Jacobs Engineering Group</td>
<td>Regina Hanson, Varec Biogas</td>
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<td>2:00-2:30 Successful Marketing Strategies for a Biosolids Fertilizer BMPs, Nutrient Stewardship and Third party agronomic trials</td>
<td>Water Quality Trading Feasibility Study with An In-Depth Site Evaluation Case Study</td>
<td>Digester Gas Treatment, Storage and Utilization Transition and Implementation at MMSD SSWRF</td>
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<td>Mike Dougherty, Lytech International</td>
<td>Mark Van Weelden, Ruekert &amp; Mielke, Inc.</td>
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<td>3:30-4:00 Strategic Planning and an Environmental Management System lead to Composting at the Metropolitan Water Reclamation District of Greater Chicago</td>
<td>Chemical Savings by Promoting Enhanced Biological Phosphorus Removal with True Batch Sequencing Batch Reactor</td>
<td>Electrocoagulation and Electroseparation Treatment of E. coli for Drinking Water Systems</td>
<td>Leadership Panel – Saying Yes, and Other Philosophies to Gain Experience, Recognition, and Career Opportunities</td>
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<td>Manuel de Los Santos, Aqua-Aerobic Systems, Inc.</td>
<td>William Lynn, Marquette University</td>
<td>Keith Haas, Racine Water and Wastewater Utilities;</td>
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<td>Joshua Gable, Centrisys/CNP</td>
<td>Nick Janous, Nexon</td>
<td>Scott Schafer, AE2S</td>
<td>Cody Schoepke, City of Fond du Lac, WI; and</td>
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<td>4:30-6:00 Exhibitor Reception</td>
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<td>Mel Butcher, Arcadis</td>
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<td>8:30-9:00</td>
<td>Dominating the Ecology of the</td>
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<td>Collection System to Reduce</td>
<td>Justin Wippo, Thermal ProcessSys</td>
<td>Energy Efficiency and Nutrient</td>
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<td>H2S Using the Principle of</td>
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<td>Collective Exclusion</td>
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<td>Ashley Emore, In-Pipe Technology</td>
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<td>Xiaolong Wang, In-Pipe Technology</td>
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<td>9:00-9:30</td>
<td>Wipe Out The Wipes Crisis</td>
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<td>process insight</td>
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<td>Yong Kim, PhD, UGISI Solutions, Inc.</td>
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<td>Study in Infiltration and</td>
<td>Des Moines WRF Eric Evans, HDR</td>
<td>Where to Get Started (FOG/HSW)</td>
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<td>Low O Production Efforts in</td>
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<td>Milwaukee, WI Julie McMillin,</td>
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<td>Pipeline Design through the</td>
<td>Impacts of Nutrient Recovery</td>
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<td>Karissa Brunotte, Greeley and</td>
<td>Effluent Under Dynamic Conditions</td>
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<td>Hansen</td>
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<td>12:00-13:00</td>
<td>Annual CSWEA Association Meeting</td>
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<td>1:30-2:00</td>
<td>From Sewage Plant to a</td>
<td>Tons of Green: Algae-Based</td>
<td>Fond du lac’s Sidestream</td>
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<td>Nutrient and Water</td>
<td>Nutrient Recovery in Waupun,</td>
<td>Deammonification Project – Design,</td>
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<td>Recovery Facility Patrick</td>
<td>Wisconsin Leo Kucek, Applied</td>
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<td>High Efficiency Calcium</td>
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<td>Env: A Comparison of Plant, Pump</td>
<td>Phosphate Recovery Technology at</td>
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<td>Station, and Interceptor Projects</td>
<td>the Madison Metropolitan</td>
<td>The Best Solution for Your Facility</td>
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<td>Jen Hurlebas, Madison Metropolitan</td>
<td>Sewerage District: Stability</td>
<td>Anton Dapic, Carollo Engineers</td>
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<td>Sewerage District Stephanie</td>
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<td>Thomsen, Strand Associates, Inc.</td>
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<td>3:00-3:30</td>
<td>Collaborating for Success in</td>
<td>Creating Value from Wastewater –</td>
<td>Evaluating Lagoon Upgrades for</td>
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<td>Grand Rapids: Improving</td>
<td>Phosphorus Recovery for Small</td>
<td>Increasingly Stringent Effluent</td>
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<td>Effectiveness, Customer</td>
<td>and Medium Sized Resource Recovery</td>
<td>Lagoon Effluent Limits Nick</td>
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<td>Jack Geisenhoss, EMA, Inc</td>
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<td>3:30-4:00</td>
<td>Partnering with Water</td>
<td>Demonstration of an Innovative</td>
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<td>Softening Providers for Chloride</td>
<td>Innovative Phosphorus Recovery</td>
<td>As Lagoon Retrofits For Cold-</td>
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<td>Compliance in Waukesha Wisconsin</td>
<td>Technology with Widespread</td>
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<td>Jim Fisher, Jacobs Tim Young,</td>
<td>Application to the Great Lakes</td>
<td>Rebecca Mattson, Barr Engineering</td>
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<td>City of Waukesha</td>
<td>Region Rick Johnson, InNow Water</td>
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<td>and Environmental Services</td>
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Session A – Digestion & Biosolids
FROM LIME STABILIZATION TO THP,
WHAT YOU NEED TO KNOW BEFORE YOU BUILD
8:30-9:00 am

This presentation will highlight the major findings, significant features, and economic impacts of the various technologies evaluated and selected. The paper will aid other municipal facilities considering a Class A biosolids solution, develop evaluation parameters and criteria for assessing various available technologies, and determine the technology that best fits the facility needs.

Sudhakar Viswanathan
Veolia
sudhakar.viswanathan@veolia.com

REDUCED LAG TIME AND ARCHAEAAL COMMUNITY SHIFT
AFTER BIOAUGMENTING ANAEROBIC CO-DIGESTERS
FED POLY-HYDROXYBUTYRATE BIOPLASTIC
9:00-9:30 am

Conventional plastics – often petroleum-derived – are resistant to biodegradation and cause ecological damage when mismanaged. Plastic production and waste generation continue to grow beyond viable resource recovery options. One component of a multi-faceted approach to improving the current plastics economy involves biodegradable plastics (bioplastics), which can alleviate environmental concerns stemming from mismanagement. However, there are currently no bioplastic waste management plans immediately scalable to handle the millions of pounds poised to enter the waste stream. New sustainable waste management options emerge from bioplastics’ ability to biodegrade. New bioplastic resource recovery options were investigated through anaerobic co-digestion. Results indicate rapid co-digester acclimation and near complete conversion of bioplastic to biogas.

Drying and Storing Methanogens
FOR STANDARD TESTING AND BIOAUGMENTATION
10:00-10:30 am

Methanogenic cultures have potential use as seed biomass for standard laboratory tests or in bioaugmentation of anaerobic digesters. However, a complete understanding of methanogenic microbial composition is still unknown. For this research, an enrichment technique was used that involved exposing methanogenic biomass to low oxygen concentrations and to repeated drying at >100°C for 24 hours, followed to rehydration and growth to develop a methanogenic culture containing significant populations of hydrogenotrophic methanogens. These dried cultures were then rehydrated and used to seed new systems. Heat drying resulted in increased specific methanogenic activity with $H_2/CO_2$. The increased $H_2/CO_2$ SMA was correlated to a decrease in relative abundance of Methanosarcina and an increase in relative abundance of hydrogenotrophic methanogens including Methanobacterium and Methanoculleus.

INVESTIGATING ACID PHASE CO-DIGESTION FOR
MEDIUM-CHAIN FATTY ACID PRODUCTION AT A
MUNICIPAL WASTEWATER TREATMENT PLANT
10:30-11:00 am

The carboxylate platform gained attention in recent years as an efficient means to recover carbon from organic wastes compared to traditional anaerobic digestion. In this study the potential to achieve medium chain fatty acid (MCFA) production using organic waste materials instead of ethanol was investigated by adding food and organic municipal solid waste as sources of electron donors to a system fermenting sewage sludge. Results revealed a shift in microbial community, with a known MCFA producing genus (Megasphaera) emerging as the dominant group of organisms, and a tenfold increase in MCFA production observed – indicating that organic wastes can be used to produce longer chain carboxylates.

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Matt Seib
Madison Metropolitan Sewerage District
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Session B – Low Phosphorus Limits

NEWLY DEVELOPED CLOTH MEDIA FOR LOW PHOSPHORUS AND REUSE APPLICATIONS AND PRACTICAL TESTING METHODS
8:30-9:00 am

Cloth media filtration has been studied and tested throughout the US. This presentation will provide a performance evaluation of a new cloth media, originally designed for the pretreatment of drinking water. Full-scale testing was conducted at the City of Platteville WRRF. Testing included variable hydraulic and solids loading rates, an attempt to use solids to improve effluent quality, and the monitoring of phosphorus (speciation), TSS, turbidity, and particle size distributions. Bench-scale testing was conducted prior to full-scale testing. This presentation will discuss the new media, testing results, the importance of a structured protocol, and the potential for water reuse application. The new cloth is an example of technology transitioning into a new generation of wastewater treatment.

Matt Castillo
MSA Professional Services, Inc.
mcastillo@msa-ps.com

WWTP EFFLUENT PHOSPHORUS FILTRATION FOR POINT-O-SEVEN-FIVE
9:00-9:30 am

Medford, Wisconsin selected disc filtration to comply with low-level effluent phosphorus limits of 0.075 mg/L. Of the many technologies, the City selected disc filtration, despite limited installs in the Central States region. The system includes coagulant addition in a rapid mix and coagulation zone, followed by polymer addition for flocculation of larger particles prior to filtration. The system was purchased with a performance guarantee, which is to be substantiated with numerous analyses and split samples providing unbiased verification of results in early 2019. The results of the guarantee period are to be presented in the paper. Key features include validation of filtered effluent phosphorus levels with speciation for soluble nonreactive phosphorus and chemical doses with respect to other technologies.

Eric Lynne
Donohue & Associates
elynne@donohue-associates.com

Ben Brooks
City of Medford, WI
bbrooks@medfordwi.us
Technical Program – Wednesday, May 15

INNOVATIVE APPROACHES TO PHOSPHORUS COMPLIANCE IN WISCONSIN
10:00-10:30 am

In 2010, Wisconsin adopted numeric standards for phosphorus concentrations in surface waters of the state. The new phosphorus targets, ranging from 15 to 100 µg/L for inland waters, protect waters from the effects of eutrophication. In recognition that strict water quality based effluent limits for phosphorus can present an economic challenge for many dischargers, and that phosphorus reductions can be achieved through nonpoint source management, Wisconsin has adopted alternative compliance and variance options for WPDES permittees. Water Quality Trading and Adaptive Management are emerging as cost-effective options that lead to long-term phosphorus compliance and better environmental outcomes. Recently, EPA approval of the Multiple Discharger Variance has opened the doors for watershed-based offsets to even more facilities seeking phosphorus compliance.

DNA TECHNOLOGY TO OPTIMIZE BIOLOGICAL PHOSPHORUS REMOVAL
10:30-11:00 am

Our understanding of the biological phosphorus removal process is being challenged as we use DNA sequencing technology to investigate microbial communities in full-scale treatment plants. One of the founders of Biological Nutrient Removal, Dr. James Barnard, has re-booted his research on biological phosphorus removal in hopes of better understanding how some treatment plants are able to perform this function without the prerequisites of volatile fatty acids and a nitrate-free anaerobic zone. His work along with more than a decade of work from Professor Nielssen’s group at Aarhus University seem to be directing us to focus on Tetrasphaera as an important but overlooked microbe in the BioP process. This paper will present data that adds to this ongoing discussion.

Matt Claucherty
Wisconsin Department of Natural Resources
matthew.claucherty@wisconsin.gov

Trevor Ghylin
Energenecs/Microbe Detectives
trevor.ghylin@energenecs.com

Kori Kenney
Milwaukee Metropolitan Sewerage District
kkenney@mmsd.com
THE SELECTION OF ADVANCED BIOLOGICAL NUTRIENT RECOVERY (ABNR) FOR PHOSPHORUS COMPLIANCE AT TWO WISCONSIN FACILITIES

8:30-9:00 am

Extensive piloting, process optimization, and facility modifications to meet future low-level phosphorus permit requirements have been researched by the Villages of Cambria and Roberts, Wisconsin. Chemical dosing, ultrafiltration, and Advanced Biological Nutrient Recovery (ABNR) were among the demonstration pilots conducted at each facility. After careful consideration and evaluation both Villages have selected ABNR to meet their low-level nutrient requirements and will proceed with full-scale integration and construction in 2019. This presentation will detail the evaluation process, design and progress of each facility.

Autumn Fisher  
CLEARAS Water Recovery  
afisher@clearaswater.com

Ed Coggin  
Weston Solutions, Inc.  
ed.coggin@westonsolutions.com

GOING GREEN: CLEARAS ABNR BENCH TESTING

9:00-9:30 am

To meet future nutrient and effluent discharge limitations, the Mankato Water Resource Recovery Facility bench tested the Clearas Advanced Biological Nutrient Removal (ABNR) process. The Clearas ABNR utilizes algae in lieu of activated sludge or chemical precipitation to remove wastewater contaminants. The Mankato WRRF conducted three weeks of bench scale testing on three separate process flows. The bench testing included one week each of secondary clarifier effluent, primary clarifier effluent, and filtrate. This presentation will review the ABNR process and compare it to EPBR and BNR; and the ABNR’s capabilities to meet Reclaimed Water Quality Effluent Standards. We will review the results of the Mankato Bench Scale Tests, Clearas’s estimated algae biomass production and revenue, and process lifecycle costs.

Patrick Haney  
HDR  
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Jim Archer  
City of Mankato  
jarcher@mankatomin.gov
CSWEA’S 92ND ANNUAL MEETING

Technical Program – Wednesday, May 15

Session D – Stormwater

AN OUNCE OF PREVENTION IS WORTH A POUND (AT LEAST!) OF CURE: HOW MMSD IS REDUCING FLOOD RISK THROUGH THE GREENSEAMS® PROGRAM AND TRADITIONAL FLOOD MANAGEMENT TECHNIQUES
8:30-9:00 am

The Milwaukee Metropolitan Sewerage District’s (MMSD) flood risk reduction program and Greenseams® work together to reduce flood risk for the Milwaukee region. Traditional flood risk reduction techniques such as levees, dams, and structure acquisition/demolition all have been used in the Milwaukee area at a total investment of over $400 million since 1995. The Greenseams® program is an innovative approach using natural flood management that seeks to permanently preserve flood-sensitive lands. Since 2001, the program has targeted undeveloped land to allow open space to function as Milwaukee’s natural sponges. Nearly 3,700 acres have been protected by an investment of $24.1 million. This presentation will discuss how MMSD’s flood risk reduction program and Greenseam® approach flood management from two points of view.

Mark Mittag
Milwaukee Metropolitan Sewerage District
mmittag@mmsd.com

RINS – BIOGAS UPGRADING FOR VEHICLE FUEL AND PIPELINE INJECTION
10:30-11:00 am

Biogas is no longer considered waste, but a valued commodity. The RIN market is a driving force in upgrading biogas to renewal natural gas quality. Case Studies will be presented on sites that are producing renewable natural gas both with standalone systems and in conjunction with combined heat and power systems. Emerging technologies are bringing more cost effective solutions to traditional gas conditioning and upgrading equipment, including H2S and CO2 removal systems. We’ll also look at how existing sites have capitalized on some new media technologies to see savings on the operation and maintenance of the equipment.

Kim Murdock-Timmerman
Unison Solutions, Inc.
kmtimmerman@unisonsolutions.com

TESTING, DESIGN, AND FULL-SCALE OPERATION OF THE FIRST INSTALLED PILE CLOTH-MEDIA DISK FILTERS FOR COMBINED TERTIARY & WET WEATHER TREATMENT
9:00-9:30 am

In order to eliminate untreated combined sewer overflow (CSO) discharges into the Flatrock River, the City of Rushville, Indiana has successfully completed the final phase of its Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) implementation program. This completion was accomplished by means of the first installed application of pile cloth media disk filters in the United States to treat CSO discharges. The presentation will be a complete case from initial piloting, state approval to one year of operating data.

Steve Stanish
Aqua-Aerobic Systems, Inc.
sstanish@aqua-aerobic.com

This work synthesizes the range of model structures that have been leveraged for algae and cyanobacteria modeling and core model features that are required to enable reliable process modeling in the context of water resource recovery facilities. Building on published process models, the core requirements of a model structure for algal and cyanobacterial processes are presented, including detailed recommendations for the prediction of growth, nutrient uptake, carbon uptake and storage, and respiration. 288 models of algae growth were built in Python capable of simulating algal growth, nutrient uptake, carbon storage, and mixotrophic metabolism. The different model structures were calibrated following the IWA Unified Protocol and were then compared based on their ability to be validated successfully.

Brian Shoener
University of Illinois at Urbana-Champaign
shoener2@illinois.edu

Session D – Stormwater

QUANTITATIVE STATISTICAL ASSESSMENT OF MICROALGAE MODELS TO OPTIMIZE MODEL STRUCTURE AND PROMOTE INCLUSION IN WATER RESOURCE RECOVERY FACILITIES (WRRFS)
10:00-10:30 am
PUBLIC PARTNERSHIPS, PERMITS, AND A PARKING LOT: UNDERGROUND-DETENTION IN GLENVIEW
10:00-10:30 am

The Bonnie Glen neighborhood in the Village of Glenview was developed without stormwater detention and experiences significant flooding during moderate to extreme rain events. Following several studies and Village wide plans, the Village and Baxter & Woodman began design of the Lyon School Detention Improvements project in 2016. While there was no available area for stormwater detention within the Bonnie Glen neighborhood, Lyon School Grounds fell immediately adjacent and downstream. The final project consists of a 4.42 ac-ft underground detention vault – compartmentalized to 4.0 ac-ft for regional detention and 0.42 ac-ft for MWRDGC and Village stormwater-permitting.

Matthew J. Moffitt
Baxter & Woodman
mmoffitt@baxterwoodman.com

ELMHURST, IL - THE CITY THAT IS FIGHTING URBAN FLOODING... AND WINNING!
9:00-9:30 am

In 2012, Elmhurst had over 1000 homes flood from rain events. By 2018, the City had designed, bid, constructed, and are now maintaining over 100-acre feet of stormwater detention reservoirs. We will talk about the process used to get prioritization of where to construct, lessons learned through out the process, and engineering and utility operational teamwork on projects.

Paul Burris
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paul.burris@elmhurst.org

Kent Johnson
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Session F – Digestion & Biosolids
ENHANCING THE MARKETABILITY OF BIOSOLIDS VIA THERMAL DRYING AND PALLETIZATION, CHALLENGES AND LESSONS LEARNED
1:30-2:00 pm

This paper will highlight details of thermal belt drying process as well as the pelletizing process and how these technologies helped Western Wake achieve their overall biosolids management goals. Lessons learned from commissioning the technologies and successfully marketing the end product to the local markets will also be discussed.

Sudhakar Viswanathan
Veolia
sudhakar.viswanathan@veolia.com

SUCCESSFUL MARKETING STRATEGIES FOR A BIOSOLIDS FERTILIZER: BMPS, NUTRIENT STEWARDSHIP AND THIRD PARTY AGRONOMIC TRIALS
2:00-2:30 pm

Lystek’s low temperature, thermal alkali hydrolysis process treats biosolids, and other organics produce a high solids liquid Class A EQ biofertilizer product, LyseGro. Lystek has actively marketed the product since 2014, with 100% of the product sold each year, while increasing the price more than 300%. A key element in the success of the program has been active participation in third party agronomic trials. This presentation will review the product marketing strategies used in this successful program, with a particular focus on results of the field trials.

Mike Dougherty
Lystek International
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CSWEA’S 92ND ANNUAL MEETING

Technical Program – Wednesday, May 15

STRATEGIC PLANNING AND AN ENVIRONMENTAL MANAGEMENT SYSTEM LEAD TO COMPOSTING AT THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO
3:30-4:00 pm

The District’s Executive Director set a strategic plan, inclusive of initiatives to improve the current biosolids program through covered technology at the Calumet Water Reclamation Plant, odor-reduction for the program at all biosolids generating facilities and increased usage of biosolids products within the city of Chicago. The District’s Biosolids Management Team (BMT) performed an evaluation of Class A producing technologies taking into account CAPEX, OPEX, footprint, environmental impact, and more. The District completed the study and concluded that composting was the best option for two of the sites. The next step was to conduct a secondary study to evaluate various composting technologies. Upon completion of two pilot studies two technologies were chosen for full-scale programs at different sites.

Dan Collins
Biosolids and Environmental Management System Consultant
dancollins1224@gmail.com

ECONOMIC ANALYSIS OF IMPLEMENTING CENTRIFUGAL THICKENING AND THERMAL ALKALI HYDROLYSIS TECHNOLOGIES IN KENOSHA WRRF
4:00-4:30 pm

Improving the efficiency of solids stream treatment could bring significant economic and environmental benefits for water resources recovery facilities. The objective of this study is to evaluate the cost and benefit of implementing centrifugal thickening and thermal alkali hydrolysis technologies at Kenosha WRRF. Key O&M considerations of the TCHP include heat transfer efficiency, fouling, and maintenance cycle. Heat exchanger maintenance has been studied in detail for thermal hydrolysis. The TCHP installation includes a hot water heat exchanger. Two combined heat and power system produced feed hot water at around 192 F. The temperature setting allows sufficient sludge hydrolysis while not overheat the sludge, which prevent the formation of high solids sludge layering on the inner surface of the heat exchanger.

Joshua Gable
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josh.gable@centrisys.us

Session G – Low Phosphorus Limits

ACCOMPLISHMENTS IN THE SILVER CREEK ADAPTIVE MANAGEMENT AND NEW WATER’S PLAN FOR FULL-SCALE ADAPTIVE MANAGEMENT
1:30-2:00 pm

NEW Water has successfully completed five years of the Silver Creek Pilot Adaptive Management Project and have evaluated several phosphorus and TSS compliance options to meet TMDL and permit conditions. This presentation will review major accomplishments of the Pilot, lessons learned and opportunities for future watershed work in Wisconsin, and the detailed evaluation that has resulted in NEW Water’s official venture into full-scale watershed Adaptive Management. The presentation will also review the Adaptive Management Plan, its approach, and strategies for implementation.

Brent Brown
Jacobs Engineering Group
brent.brown@jacobs.com

WATER QUALITY TRADING FEASIBILITY STUDY WITH AN IN-DEPTH SITE EVALUATION CASE STUDY
2:00-2:30 pm

The Columbus, WI Wastewater Treatment Facility is required to reduce effluent phosphorus levels to the Crawfish River. The purpose of this study was to evaluate compliance alternatives with special emphasis on water quality trading. In order to evaluate the feasibility of this alternative, the watershed was extensively studied and several potential sites for agricultural conservation measures were identified. The results of the watershed inventory indicated that that water quality trading is a viable compliance alternative, particularly in conjunction with optimization at the treatment facility. Since the inventory, a large agricultural site has been evaluated for participation in the water quality trading program. Several conservation measures were proposed for implementation, and specific details of this case study will be discussed.

Mark Van Weelden
Ruekert & Mielke, Inc.
mvanweelden@ruekert-mielke.com
CHEMICAL SAVINGS BY PROMOTING ENHANCED BIOLOGICAL PHOSPHORUS REMOVAL WITH TRUE BATCH SEQUENCING BATCH REACTOR
3:30-4:00 pm

Phosphorus removal is making its way to the Midwest. Some states, such as Wisconsin needing to meet 0.075 mg/l TP. In order to meet phosphorus removal most plants add metal salt to precipitate phosphorus. This paper will cover the advantages of achieving biological phosphorus removal to save in chemical addition, using a True Batch SBR system as example. Details of how enhanced biological phosphorus removal occurs in the SBR cycles will be covered. In addition, suggestions on chemical addition point will be given. The paper will also include some examples of SBR plants around the US meeting low phosphorus removal.

Manuel de Los Santos
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BEAT ULTRA-LOW PHOSPHORUS AND METALS TARGETS WITH REACTIVE FILTRATION: HOW CITRONELLE, AL AND GEORGETOWN, CO CONSISTENTLY HIT 5 µg/L TARGETS
4:00-4:30 pm

With Phosphorus-fed algae blooms plaguing many North American bodies of water and as the danger of metals rises in the public consciousness, regulators are putting pressure on wastewater treatment facilities to meet ever-lower Phosphorus and Metals limits, down to micrograms per liter. This presentation will explain Blue PRO’s proprietary reactive filtration process’ adsorption/reaction kinetics and how it improves on traditional sand filters’ particle coagulation and filtration.

Nick Janous
Nexom
njanous@nexom.com

SESSION H – SMORGASBORD: ALGAE, BIOGAS, & DISINFECTION

UNDERSTANDING DESIGN STANDARDS AND CODES FOR BIOGAS SYSTEMS
1:30-2:00 pm

Our primary focus is to present on the latest best practices and design concepts for biogas capture, transmission, and utilization. We will highlight common design standards and codes in the US and in the central states. We will touch on applicable design standards presented in:
2. ANSI/CSA B149.6, Code for Digester Gas, Landfill Gas, and Biogas generation and utilization.
3. 10-State Standard - Recommended Standards for Wastewater Facilities.
4. NFPA 820, Fire Protection standard for Wastewater Treatment Facilities

Regina Hanson
Varec Biogas
regina.hanson@varec-biogas.com

DIGESTER GAS TREATMENT, STORAGE AND UTILIZATION TRANSITION AND IMPLEMENTATION AT MMSD SSWRF
2:00-2:30 pm

Digester gas produced by anaerobic digesters at the Milwaukee Metropolitan Sewerage District (MMSD) South Shore Water Reclamation Facility (SSWRF) has been beneficially used as fuel since the plant began operation in 1968. SSWRF now operates five engine generators and three hot water boilers on digester gas. By 2010 the effects of siloxane on the engines and boilers were being noticed and impacting maintenance costs and increasing downtime. This paper describes the transition to gas treatment at SSWRF after 50 years of digester gas use. The digester gas treatment system includes moisture and siloxane removal. Concurrent with the addition of gas treatment, the gas storage and distribution system was modified to improve gas utilization and increase operating flexibility.

Jay Kemp
Black & Veatch
kempjs@bv.com
Sequential electrocoagulation-electrooxidation (EC-EO) was used to treat E. coli in four model drinking waters (2 surface and 2 groundwaters). Operating parameters were five minutes at 10 mA/cm² for EC and one minute at 1.67 mA/cm² for EO. EO alone achieved four-log reduction of E. coli in the model groundwaters. E. coli reduction was demonstrated by EC in all waters, but no additional mitigation occurred by EC-EO. Reducing pH to six improved E. coli reduction by EC-EO in the surface waters. Increased mitigation likely stemmed from either higher natural organic matter removal or the presence of ferrous iron species as oxidation of ferrous iron during EO could enhance E. coli reduction.

**William Lynn**
Marquette University
william.lynn@marquette.edu

**CURRENT AND HISTORICAL WASTEWATER DISINFECTION PRACTICES: A WEF SURVEY**
4:00-4:30 pm

Wastewater disinfection is a critical component of WRRFs for the protection of public health. The WEF Disinfection and Public Health Committee (DPHC) recently conducted a survey of disinfection practices across the US, which is part of a series of surveys that the committee has conducted periodically since 1979. This presentation is a summary of the recent disinfection practices survey results, comparison with historical disinfection practices, and discussion of general trends in wastewater disinfection permitting, methods, and operations.

**Scott Schaefer**
AE2S
scott.schaefer@ae2s.com

**LEADERSHIP PANEL – SAYING YES, AND OTHER PHILOSOPHIES TO GAIN EXPERIENCE, RECOGNITION, AND CAREER OPPORTUNITIES**
3:30-4:30 pm
Session K – Collections Systems

DOMINATING THE ECOLOGY OF THE COLLECTION SYSTEM TO REDUCE H₂S USING THE PRINCIPLE OF COMPETITIVE EXCLUSION
8:30-9:00 am

The competitive exclusion principle states that two organisms in competition for the same resources are incapable of maintaining constant populations sizes because one organism has an advantage that allows it to dominate. The organism without the advantage will either die off or compete for alternative resources. In the wastewater environment, bacteria have developed several strategies to outcompete other microorganisms to ensure the survival of their species. In fact, bioaugmentation specialists, such as In-Pipe Technology, supply bacterial blends to WWTPs to address common plant problems. The aim of this presentation is to explain the different strategies employed by bacteria to competitively exclude other microorganisms in the wastewater environment and explain the role that competitive exclusion has in reducing hydrogen sulfide.

Ashley Elmore
In-Pipe Technology
aelmore@in-pipe.com

Xiaolong Wang
In-Pipe Technology
xwang@in-pipe.com

WIPE OUT THE WIPES CRISIS
9:00-9:30 am

Our aging wastewater infrastructure was not designed to handle flushable wipes and other non-dispersible fabrics popular today. In 2014, JWC Environmental embarked on a testing and development program to understand the differences in grinding technologies for wipes and understand how the shredded materials reacted in the sewer system. The presentation will review today’s status of the wipes market, PSA and legal efforts to curb disposal of non-disposables in sewage systems and look at technical options in pumps and grinders to pre-condition wipes in collection systems. The overall goal is to provide information on the various options available to battle wipes.

Tim Miller
JWC Environmental
timm@jwce.com

PIPECUT DESIGN THROUGH THE EYES OF A YOUNG PROFESSIONAL
10:00-10:30 am

Through the Milwaukee Metropolitan Sewerage District’s Private Property Infiltration and Inflow (PPI/I) Reduction Program, the I/I reduction effectiveness was evaluated for areas with rehabilitation on either (a) public property only, or (b) both public and private property efforts. The City of Milwaukee plans to use the evaluation results to improve its PPI/I Reduction Program. Lateral lining was effective at reducing the five-year peak hour I/I by about 40% in the evaluated area. Additional rehabilitation with foundation drains disconnected from the sanitary sewer lateral had greater reductions in I/I but with variable results. Areas with just public property rehabilitation experienced little I/I reduction. It appears that rehabilitation of both public and private assets is needed for quantifiable I/I reduction.

Julie McMullin
Brown and Caldwell
jmcullin@brwnca1d.com

PUBLIC VERSUS PRIVATE: A CASE STUDY IN INFILTRATION AND INFLOW REDUCTION EFFORTS IN MILWAUKEE, WI
10:30-11:00 am

As population growth ripples outward from cities along the Great Lakes, reliance upon local groundwater sources is becoming more unsustainable. With the multitude of factors that affect the planning and design of a pipeline, transitioning to a sustainable source water can be challenging, particularly when 23-miles of new pipeline is required. The thoughtful approach presented in this case study demonstrates unique insights from a young professional’s perspective into designing a 23-mile pipeline and the lessons learned from the process.

Karissa Brunette
Greeley and Hansen
kbrunette@greeley-hansen.com
Session L – Phosphorus Recovery

Targeted Phosphorus Recovery

8:30-9:00 am

Targeted Phosphorus Recovery is a newly developed technology that addresses rising issues in wastewater treatment facilities surrounding elevated phosphorus levels. The technology concentrates on the root causes of these issues and rectifies them through biology and applying known chemistry in a new way. TPR aims to improve the operations of wastewater treatment plants in a variety of ways that provide significant benefits to both the facility and the environment.

Justin Wippo
Thermal Processs Systems
jwippo@thermalprocess.com

Doubling Down on Phosphorus

9:00-9:30 am

The Madison Metropolitan Sewerage District (MMSD) installed Ostara’s nutrient recovery system including Pearl and WASSTRIP technologies at their Nine Springs plant in 2013. The system started up well and achieved several benefits for MMSD; however, phosphorus recovery fell short of expectations due to washout of fine struvite particles (fines loss). In recent years, Ostara and MMSD collaboratively tested several strategies with the goal of improving recovery and reducing fines loss. These efforts have yielded twice as much phosphorus recovery, increasing the average monthly Crystal Green production from one ton/day to two tons/day, with fines loss going from 60% to less than 30%.

Rachel M. Lee
Ostara Nutrient Recovery Technologies, Inc.
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Mikaela Verigin
Ostara Nutrient Recovery Technologies, Inc.
mverigin@ostara.com

Phosphorus Control at Des Moines WRF

10:00-10:30 am

The Des Moines Water Reclamation Authority (WRA) operates a water reclamation facility (WRF) with nitrifying activated sludge currently. In order to achieve phosphorus removal, the WRA is testing optimization in concert with their planned phosphorus harvesting system. Several evaluation steps have been undertaken as part of this effort. The study has included the following:
- Development and testing of the phosphorus release process.
- Calibration of Biowin™ and scenario testing with different aeration strategies.
- Minimal aeration mixing in pass 1.
- Contact-stabilization.
- Full-scale testing of biological phosphorus removal in aeration basins in basins 5 and 6.
- Testing with low aeration and intermittent bumping of pass 1.
- Testing of wet weather mode by running in a contact stabilization configuration.

Eric A. Evans
HDR Engineering
eric.evans@hdrinc.com

Impacts of Nutrient Recovery Performance on Achieving Low-P Effluent Under Dynamic Conditions

10:30-11:00 am

Given the uncertainty found in the literature on struvite kinetic parameters, work is undergoing at facilities with operating NR units to evaluate the characteristics of the uncaptured crystals, and to determine the dissolution rate parameters more accurately. A new collaboration has been formed with University of Illinois, the mentioned utilities, Consultants and providers of NR technologies. With the rate parameters developed by the research team, dynamic models developed for select Utilities will be updated to re-evaluate the impacts of the NR system performance. This paper/presentation will describe the most recent results from this on-going work.

Tom Johnson
Jacobs
tom.johnson2@jacobs.com
Session M – Energy Reduction

SANITAIRE OSCAR® APPLICATION IN ENERGY EFFICIENCY AND NUTRIENT REMOVAL
8:30-9:00 am

The Sanitaire ICEAS® is a continuous flow biological treatment system that provides multiple advantages over conventional activated sludge and other SBRs by bringing together process, aeration, decanting, and control in a single treatment tank. The OSCAR control system is a customizable, integrated system designed for use with the ICEAS system to meet restrictive nutrient requirements and operating budget. Application of process optimizers with OSCAR can lead to increased nutrient removal and energy savings from reduced blower operation.

Dylan Friss
Xylem-Sanitaire
dylan.friss@xyleminc.com

EVALUATION OF HIGH PRECISION IN-SITU ANALYSIS AGAINST BENCHTOP LAB ANALYZERS FOR PROCESS INSIGHT
9:00-9:30 am

Lab analysis of composite samples has traditionally been the basis of plant operation and daily adjustments. By using in-situ analyzers that can very precisely correlate to real-time process conditions actual process conditions can be seen versus average. This has significant benefits for energy optimization, nutrient removal, and permit compliance. By running test trails of in-situ analyzers against grab samples analyzed on the bench-top the precision of the analyzers showed remarkable correlation. More importantly, seeing the real-time data from 48 daily data points revealed changes in process that were washed out in traditional composite sampling.

Dave Rutowski
Hach
dave.rutowski@hach.com

GENEROUS ORTHODOXY:
UNDERSTANDING THE FUTURE OF DISSOLVED OXYGEN SETPOINTS WHILE ACKNOWLEDGING THE PAST
10:00-10:30 am

Biological treatment processes have been utilized for over a century, with continual growth in the understanding of the intricacies of the process. Throughout the evolution of activated sludge, DO has been a focus of operational control. Early activated sludge featured completely mixed tanks to aide with oxygen uptake requirements and provide what was believed to be more stable growth conditions for microorganisms. These growth pressures established our mindset around DO setpoints. As we have learned more about the growth pressures exerted in activated sludge, we have gained insight in the impacts of low DO on carbon fate, microbial competition, and filament growth. This presentation will summarize full-scale experience with low DO operation relative to these three areas of knowledge.

Leon Downing
Black & Veatch
downingl@bv.com

TO ABAC AND BEYOND:
INTEGRATING ADVANCED CONTROLS TO OPTIMIZE PERFORMANCE AND RESOURCE UTILIZATION
10:30-11:00 am

Wastewater utilities are being faced with increasingly stringent nutrient regulations while also trying to increase energy efficiency. These two goals often have competing operational and design considerations with the focus of maintaining effluent performance receiving priority. Integration of advanced controls strategies can be implemented to increase efficiency without sacrificing performance reliability. This abstract will focus on the fundamentals of advanced control systems, with ammonium-based airflow control (ABAC) used as a representative control strategy to describe design, tuning and operation of advanced control systems. The abstract includes two case studies with increasingly complex control strategies.

Colin Fitzgerald
Jacobs
colin.fitzgerald@jacobs.com
## Technical Program – Thursday, May 16

<table>
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<tr>
<th>Session N – Facility Management &amp; Optimization</th>
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<tr>
<td><strong>Oxidation Reduction Potential, A Versatile But Misunderstood Wastewater Treatment Monitoring Parameter</strong></td>
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<td>Oxidation reduction (redox) reactions have a central role in wastewater management. Biologically mediated redox reactions include for BOD removal, nitrification, denitrification, sludge digestion, and fermentation. Furthermore, disinfection and odor control are also achieved chemically via redox. Oxidation reduction potential (ORP) measurement systems provide a relative measurement of the tendency of a sample matrix to support various types of redox reactions. The trend and value of ORP are useful for evaluating the status of treatment processes.</td>
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Laura St. Pierre  
YSI, a Xylem brand  
laura.st.pierre@xyleminc.com

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<th>IMPACT OF OPTIMIZING POLYMER ACTIVATION ON SLUDGE DEWATERING</th>
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<td>A well-designed polymer system is the key for achieving desired performance in dewatering process. There are several factors that affect the efficiency of polymer solution including dilution water quality, mixing profile, and appropriate aging. This paper illustrates how to optimize polymer activation with experimental data and case studies at water and wastewater treatment plants. To optimize the emulsion polymer activation, it is essential to understand the importance of two-stage mixing, two-stage dilution to make most use of inverting surfactant, and sufficient residence time of mix chamber. Since dry polymer particle size is thousands times larger than emulsion polymer gels, preventing fisheye formation at initial wetting stage is critical to reduce the necessary mixing time and ease the need for aging.</td>
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Yong Kim  
UGSI Solutions, Inc.  
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<th>THE ROAD TO ENERGY NEUTRALITY – WHERE TO GET STARTED (FOG/HSW)</th>
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<td>Aging infrastructure and stricter permit limits prompted the Kishwaukee Water Reclamation District to upgrade to a Biological Nutrient Removal process. This upgrade came with the ‘bonus’ of doubling the District’s electrical bill. To reduce those costs, the District pursued two plans of attack: 1) energy-efficient equipment, and 2) increased biogas production for in-situ energy generation. With four underutilized anaerobic digesters and a ‘weak’ influent, the District implemented the Fat, Oil and Grease (FOG) Receiving program. This case study explains the collaborative process between the District, Baxter &amp; Woodman, and waste haulers to design an operations-friendly FOG/HSW Receiving Station and Cogeneration Facility that will allow the District to generate energy and work towards their goal of becoming energy-neutral by 2030.</td>
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Eider Alvarez  
Baxter & Woodman, Inc.  
ealvarez-puras@baxterwoodman.com

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<th>CITY OF TULSA AND LAFAYETTE WASTEWATER TREATMENT PLANT STRESS TESTING</th>
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<td>10:30-11:00 am</td>
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<td>The city of Tulsa Southside Wastewater Treatment Plant (WWTP) is rated for an average capacity of 42 mgd and a peak flow capacity of 84 mgd. The City of Lafayette, Indiana WWTP is rated for an average capacity of 26 mgd and a peak flow capacity of 52 mgd. Greeley and Hansen conducted hydraulic stress testing at both plants to determine true peak capacity at the plant. The goal of the Southside WWTP plant stress test was to develop a wet weather flow optimization strategy to eliminate combined sewer overflows. The goal of the Lafayette WWTP stress test was to evaluate the possibility of a plant re-rate and determine if a re-rate should be pursued.</td>
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Mike Holland  
Kishwaukee Water Reclamation District  
MHolland@kishwrd.com

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<th>Chris DeSilva</th>
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| Greeley and Hansen  
cdesilva@greeley-hansen.com |
Session O – Operators Track

OPERATORS TRACK
Thursday, May 16 | 8:30 to 11:00 am

The CSWEA Annual Conference will again be offering an Operators Track developed for operators with an emphasis on the fundamental of key operation topics. Designed for operators, this session features practical information related to pumps, instrumentation, valves, and process equipment. Presenters are operators and wastewater professionals knowledgeable of daily wastewater operations.

The format of the Operators Track will promote interaction, networking and learning. Anyone interested in learning more about, or contributing to, the art and science of wastewater operations should consider attending.

Session P – Utility Management

SEWAGE PLANT TO A NUTRIENT, ENERGY AND WATER RECOVERY FACILITY
1:30-2:00 pm

The City of St. Cloud, Minnesota continues its transition from straight pipe discharge of waste to the Mississippi River to an innovative NEW Recovery Facility. The presentation will provide a brief history followed by details of the nutrient, energy and water recovery aspects of the 18 million gallon per day facility.

Patrick Shea
City of St. Cloud, Minnesota
patrick.shea@ci.stcloud.mn.us

SEEKING SUSTAINABLE SOLUTIONS WITH ENVISION: A COMPARISON OF PLANT, PUMP STATION, AND INTERCEPTOR PROJECTS
2:00-2:30 pm

The Madison Metropolitan Sewerage District and Strand Associates, Inc. developed a standard process for utilizing the Institute of Sustainable Infrastructure Envision framework for three different types of projects: treatment plant, pump station, and interceptor sewer. The projects that will be used for case studies completed design in 2018 using the Envision v2 framework. While a standard process was developed, the sustainable features incorporated and Envision scoring results for each project were different. Comparing the Envision scoring results on different types of projects provides insight into the following questions: 1) Does the type of project impact the opportunities for incorporating sustainable features? and 2) Should the standard process be modified based on sustainable opportunities?

Jen Hurlebaus
Madison Metropolitan Sewerage District
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Stephanie Thomsen
Strand Associates, Inc.
stephanie.thomsen@strand.com
COLLABORATING FOR SUCCESS IN GRAND RAPIDS: IMPROVING EFFECTIVENESS, CUSTOMER SERVICE, AND SAVING $25M
3:00-3:30 pm

Since implementing recommendations from an operational assessment and ongoing improvements, the City of Grand Rapids Water System (Water) and Environmental Services Department (ESD) have transformed their organization, improved operational effectiveness, and saved at least $25 million in operating costs between 2009 and 2015. To do this they performed an operational assessment and developed a roadmap of prioritized recommendations to reach their future state of operations. This session will review some of the significant changes Water and ESD have made and why, how they collaborated to make it all work, and the challenges and technologies they foresee needing to meet their needs in the future.

Jack Geisenhoff
EMA, Inc.
jgeisenhoff@ema-inc.com

PARTNERING WITH WATER SOFTENING PROVIDERS FOR CHLORIDE COMPLIANCE IN WAUKESHA WISCONSIN
3:30-4:00 pm

The City of Waukesha received formal approval for obtaining Lake Michigan water to replace the current groundwater supply. This has a significant impact on chloride reduction strategies and timelines associated with returning effluent to the Lake Michigan watershed. The effluent limit is anticipated to be 400 mg/L and a variance to extend the compliance schedule is not anticipated. This will require a significant reduction from historical effluent chloride concentrations. This presentation will include project background, the required chloride reduction, estimates of achievable reductions from softener optimization, a description of the partnering with the WQA and local water conditioning companies, the softener optimization parameters and goals, prioritization of water softener optimizations, and implementation.

Jim Fisher, PE
Jacobs
jim.fisher@jacobs.com

Tim Young
City of Waukesha
tyoun@waukesha-wi.gov

Session Q – Phosphorus Recovery
TONS OF GREEN: ALGAE-BASED NUTRIENT RECOVERY IN WAUPUN, WISCONSIN
1:30-2:00 pm

Nutrient-rich surface waters across our region team with uncontrolled algae. However, algae can be harnessed to drive a ‘green’ economic and environmental future via nutrient recovery. To meet ultra-low phosphorus limits, Waupun Utilities evaluated various technologies, including algae-based advanced biological nutrient recovery (ABNR). An ABNR pilot test at Waupun confirmed that the system could consistently meet effluent phosphorus concentrations below the detection limit (0.02 mg/L). At Waupun’s facility, the ABNR system is also expected to generate significant annual revenues, offering an economical, environmentally sustainable waste recovery process. This presentation will share the facilities plan results, wherein algae-based ABNR technology was evaluated.

Leo Kucek
Applied Technologies, Inc.
lakucek@ati-ae.com

HIGH EFFICIENCY CALCIUM PHOSPHATE RECOVERY TECHNOLOGY AT THE MADISON METROPOLITAN SEWERAGE DISTRICT: STABILITY METRICS, DESIGN OPTIMIZATION, AND PERFORMANCE
2:00-2:30 pm

Sludge streams present promising opportunities of nutrient recovery. Brushite and struvite crystallization are two feasible methods of phosphorus recovery. This study was completed between April and November of 2018 in preparation for a Water Research Foundation (WRF) project to evaluate the CalPrex™ brushite phosphorus recovery technology. The process was systematically optimized while running at the Madison Metropolitan Sewerage District’s Nine Springs plant. Once stable, a mass balance study was completed at four-time intervals to determine the process start-up equilibration period. Optimal system performance was achieved between six and 12 hours after start-up and operation parameters remained stable after that. This was followed by eight mass balance samplings as part of the WRF study to benchmark the performance of CalPrex.

Menachem Tabanpour
Centrisys-CNP
menachem.tabanpour@cnp-tec.us
CREATING VALUE FROM WASTEWATER – PHOSPHOROUS RECOVERY FOR SMALL AND MEDIUM SIZED RESOURCE RECOVERY FACILITIES
3:00-3:30 pm

This presentation will highlight our recent development work for a novel phosphorous recovery process and pilot testing of the same at a local wastewater utility that has a severe struvite problem. In this economic climate, utilities are increasingly choosing between compliance and sustainability. This collaborative effort demonstrates that developing and applying a simple solution can achieve both.

Sudhakar Viswanathan
Veolia
sudhakar.viswanathan@veolia.com

DEMONSTRATION OF AN INNOVATIVE PHOSPHORUS RECOVERY TECHNOLOGY WITH WIDESPREAD APPLICATION TO THE GREAT LAKES REGION
3:30-4:00 pm

This presentation will focus on discussion around a growing alternative technology that focuses on the recovery of phosphorus in heavily loaded side stream applications through the recovery of phosphorus in the form of amorphous calcium phosphate. The presentation will specifically focus on two primary applications: results of a recently completed extended duration program at a direct discharger (10MGD) to the Maumee River—the largest contributor of phosphorus to the Western Basin of Lake Erie, and a swine lagoon application in Central Ohio where the desire was to allow for use of the lagoon water in center pivot irrigation in an area where soil phosphorus levels are limiting growth of the operation.

Rick Johnson
Applied Environmental Solutions
rj@r2hsolutions.com

Session R – Ammonia Removal

FOND DU LAC’S SIDESTREAM DEAMMONIFICATION PROJECT: DESIGN, STARTUP, AND LESSONS LEARNED
1:30-2:00 pm

The City of Fond du Lac decided to implement a sidestream deammonification process to remove ammonia from the centrate recycle flow. The main benefits of the process are reduced energy requirements, capital cost savings by delaying a major capacity expansion, reduced carbon consumption to help drive biological phosphorus removal, and reduced nitrate loading to the anaerobic/anoxic zones in the BPR facilities. This presentation recaps the previous planning study that selected the deammonification system, but will mainly focus on the design of the new facilities, the start-up of the new process, and the lessons learned throughout the process. The presentation will provide insight to others that are interested in pursuing and implementing sidestream deammonification processes.

Randy Wirtz
Strand Associates, Inc.
randy.wirtz@strand.com

Cody Schoepke
City of Fond du Lac, WI
cschoepke@fdl.wi.gov

IS SIDESTREAM TREATMENT TO MEET AMMONIA LIMITS THE BEST SOLUTION FOR YOUR FACILITY?
2:00-2:30 pm

Sidestream treatment is gaining momentum in the municipal wastewater industry as a means to reduce nutrient loading to the mainstream, thereby improving process performance and effluent quality. Recent evaluations have found that some facilities with high-strength recycle streams will not benefit from sidestream treatment. The goal of this presentation is to help WRRF owners faced with tightening effluent nutrient limits navigate the complexities of deciding whether to implement sidestream treatment at their facilities.

Anton Dapcic
Carollo Engineers
adapcic@carollo.com
EVALUATING LAGOON UPGRADES FOR INCREASINGLY STRINGENT EFFLUENT LIMITS
3:00-3:30 pm

As municipalities and industries face increasingly stringent discharge permit effluent limits, lagoon facilities that have been used for decades are often no longer able to achieve compliance. In the face of new effluent limits, a decision to either construct a new mechanical wastewater treatment facility, upgrade existing lagoon facilities, or convey wastewater to another treatment facility must be made. Three planning level case studies will be presented that highlight the technologies and alternatives considered for lagoon upgrades with varied project drivers.

Nick Bartolerio, PE
Strand Associates, Inc.
nick.bartolerio@strand.com

SUBMERGED ATTACHED-GROWTH REACTORS AS LAGOON RETROITS FOR COLD-WEATHER AMMONIA REMOVAL
3:30-4:00 pm

Small towns that operate wastewater treatment lagoons struggle to meet ammonia limits in cold weather. Submerged attached growth reactors (SAGR TM) are a viable lagoon retrofit for promoting cold-weather ammonia removal. To inform future lagoon retrofits with SAGRs, we investigated the performance, sizing, biomass production, and microbial abundance in one full-scale lagoon-SAGR in Walker, IA. We analyzed 27,159 discharge monitoring report data points and performed 16S amplicon sequencing on biofilm samples. At its current size, the lagoon-SAGR never exceeded permitted ammonia limits, but size reductions should be used for future retrofits. Our results also suggest that increasing SAGR biomass before cold-weather and an abundance of microbes with diverse ammonia removal metabolisms are components of a successful lagoon-SAGR.

Rebecca Mattson
Barr Engineering
bmattson@barr.com

CLARIFYING SETTLING TANK CAPACITY - 2D AND 3D CFD APPLICATIONS FOR PRIMARY AND SECONDARY CLARIFIERS
1:30-2:00 pm

Despite being critical processes in WRRFs, clarifiers are often evaluated with simplistic approaches. Our knowledge of the physical processes in clarifiers has advanced and the speed and memory of computers has increased by orders of magnitude. It is now possible to use computational fluid dynamics (CFD) models as a base tool for clarifier design and optimization. Clarifier CFD models are especially useful for evaluation of potential wet weather impacts due to increased hydraulic and solids loading. This presentation will include three case studies involving the use of 2D and 3D CFD models to evaluate clarifier capacity and identify opportunities to enhance the capacity of existing infrastructure. The case studies included will cover a variety of clarifier types and geometries.

William Martin
Hazen and Sawyer
wmartin@hazenandsawyer.com

CONSIDERATIONS FOR DENSIFICATION OF ACTIVATED SLUDGE TO IMPROVE PERFORMANCE AND TREATMENT CAPACITY
2:00-2:30 pm

Advanced biological treatment for carbon and nutrient control technologies that unlock treatment capacity, while also minimizing capital and operating costs is a primary goal of utilities. Recent work has demonstrated that increasing settling velocity and sludge compression properties may allow utilities to operate activated sludge basins at mixed liquors between 6,000 and 8,000 mg/L. Densification of activated sludge in this manner requires an understanding of the site specific factors that lead to rapid settling and sludge compaction. This paper will review insights from three different full-scale WRRF case studies utilizing metabolic selectors to improve settle-ability. The focus will be on documenting how environmental and operational parameters impact site specific settling, compaction, nutrient removal performance and overall secondary clarifier capacity.

Wendell Khunjar
Hazen and Sawyer
wkunjar@hazenandsawyer.com
GLOBAL WATER STEWARDSHIP: BIO-GARDEN CONSTRUCTION AND 2018-2019 UPDATE
3:00-3:30 pm

This year marked many firsts for the GWS group, as well as some continued programs and growth. Our student design competition winners presented their design to the local community for the first time. This was also the first year that we worked with the local officials to present two-day long training seminar in wastewater treatment plant maintenance and operations. We continued our efforts in data collection and community outreach for the 2019 student design competition project location. We worked in the schools there to teach children about wastewater treatment. We also built our second biogarden, which will serve as a means to treat greywater.

Joe Lapastora
Northern Moraine WRD
lapastora@nmwrd.org

INTENSIFICATION: WHEN DOES IT MAKE SENSE OR CENTS?
3:30-4:00 pm

Every year technology shrinks the world, allowing us to cram more capacity and functionality into smaller devices. The wastewater industry is no different. New intensification technologies allow us to accomplish higher performance within the existing footprint of an aeration basin or clarifier. For facilities constrained by space and unable to construct additional tankage, intensification technologies can be a valuable tool. However, these technologies are not without their own costs, and they may not be the right decision for all facilities. This paper will review four different intensification technologies, highlight the advantages and disadvantages of each, and examine three case studies where facilities chose whether or not to implement intensification technology.

Matt Sokolowski
Carollo Engineers
msokolowski@carollo.com

Session T – Ethics
BACK TO THE FUTURE FOR PROFESSIONAL ETHICS
1:30-2:30 pm

ETHICS AND ENVIRONMENTAL PROBLEMS
3:00-4:00 pm

Mark C.E. Peterson, PhD, is Professor of Philosophy at the University of Wisconsin Milwaukee’s College of General Studies. Dr. Peterson has published and lectured on environmental ethics and philosophies of nature for the past 30 years in places as diverse as Riga, Latvia; Shanghai, China; and Newberg, Wisconsin. His major research interests are strung along the fault lines joining religion and nature with the history of science and technology.
Local Arrangements Committee

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<th>Name</th>
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Technical Program Committee

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Exhibit Hall Floor Plan

Exhibitors

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<td>William/Reid A division of Gasvoda &amp; Associates, Inc.</td>
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<td>Wisconsin Pump Works</td>
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<td>Xylem Inc</td>
<td>413 &amp; 415</td>
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<td>Xylem Sanitaire</td>
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</table>
Rajendra P. Bhattarai is a member of the 2018-2019 Board of Trustees for the Water Environment Federation (WEF), an international organization of water quality professionals headquartered in Alexandria, VA.

Raj is the president and founder of Clean Water Strategies that provides technical and regulatory services for sustainable water solutions. He has nearly four decades of public sector experience in water quality management and water resource recovery as the manager of Environmental and Regulatory Services Division at Austin Water for almost 35 years and as an engineering assistant at the Texas Department of Water Resources for 3½ years.

Raj served as the 2007-2008 president of the Water Environment Association of Texas (WEAT), as a WEF Delegate, and as a member of several WEF Task Forces and Committees. He was President of the Texas Association of Clean Water Agencies in 2001, 2013 and 2014, and a board member of the National Association of Clean Water Agencies, and President of the Water Environment & Reuse Foundation, where he also chaired the Research Council.

Raj received the Gascoigne Medal and the Bedell Award from WEF, and the Mahlie Award from WEAT for ‘significant contributions to the art and science of wastewater treatment and water pollution control’. He has a Bachelor in Civil Engineering from the Indian Institute of Technology, Kanpur and a Master’s Degree in Environmental Health Engineering from the University of Texas at Austin. Raj is a Distinguished Alumnus of the Civil, Architectural and Environmental Engineering Department of the University of Texas at Austin, and a WEF Life Member and a WEF Fellow. He has more than 130 presentations and publications to his credit.

About WEF
The Water Environment Federation (WEF) is a not-for-profit technical and educational organization of 35,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals; enrich the expertise of water professionals; increase the awareness of the impact and value of water; and provide a platform for water sector innovation. To learn more, visit www.wef.org.
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