CENTRAL STATES WATER

The Official Magazine of the Central States Water Environment Association, Inc.

Tribute to *James Shaw*

PLANT PROFILE:

GREATER Innovation, Improvement and Excellence in St. Cloud

PLUS:

93rd Annual Meeting Highlights
25th Annual Education Seminar
1st Annual Midwest Student Design Competition
WEFTEC '19 Recap

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DEPARTMENTS

Messages

CSWEA/WEF/GWS News

Section News

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Design/Layout: Kristy Unrau
Marketing Manager: Darrell Harris, *darrell@kelman.ca*
Advertising Co-ordinator: Stefanie Hagidiakow
Federal tax# 23-7378788

Central States Water, the official magazine of the Central States Water Environment Association, Inc., is published four times per year. Send comments, news items, gloss photographs or digital images to Mohammed Haque, *mhaque@cswea.org*

Send undeliverable addresses to: CSWEA, 1021 Alexandra Blvd, Crystal Lake, Illinois 60014

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CSWEA Performing Well

By Doug Henrichsen

It has been a busy time for all since my last message. I hope you all enjoyed the holiday season in the Central States region! Throughout our three states, there is a lot going on and everyone that I speak to seems to be very busy. As I get into this message, please consider how well we are performing.

There have been several big events that have occurred in our area since my last message, including WEFTEC 2019; the IL Section Operations Seminar, several Operator Training Courses, Illinois Section Up State Operations Seminar, and the 2019 Biosolids, Energy, Environmental Recovery (B.E.E.R.) Seminar; the MN Section Collections Workshop (w/ MWOA), and Conference on the Environment; the WI Section Emerging Contaminants in Water and Wastewater Symposium, Phosphorous & Nutrients Operations Seminar, Industrial Pretreatment Seminar, WI Section Annual Business Meeting, and the Stormwater and Watershed Webinar; and other events. I will briefly cover each of these events below.

WEFTEC 2019

WEFTEC is one of the premier events in our industry, with over 200 technical sessions, workshops, mobile sessions, local facility tours, and over 1,000 exhibitors. At WEFTEC this year, the CSWEA/IWEA annual Welcome Reception was held on Sunday, September 22. The event was well attended. CSWEA also performed well during WEFTEC with the Operations (OPS) Challenge. Our two teams both placed at the awards level. The **Shovelers** placed first in Process Control, and the **Pumpers** placed fourth in Laboratory. The members in the teams are as follows:

CSWEA PUMPERS

- Marc Zimmerman (Coach), Janesville WWTP, WI
- Aaron Berry, Trotter Associates, Inc., IL
- Brian Schoenecker, City of St. Cloud, MN
- Joe Watson, NEW Water, WI
- Mark Knuth, Racine WWTP, WI

CSWEA SHOVELERS

- Chris Lefebvre (Coach), Stevens Point, WI
- Brandon Stall, WLSSD, MN
- Brent Perz, Baxter & Woodman, IL
- Jason Robbins, Kishwaukee WRD, IL
- Wade Lagle, Urbana & Champaign SD, IL

TRAINER

- Brian Skaife, Janesville WWTP, WI

If you see them, please congratulate these team members for a job well done this year.

Pilgrim's Pride was also the Industrial Water Quality Achievement Award Winner at WEFTEC 2019! **Brian Mehr** and **Ronald Olmscheid** were present to accept the award. Congratulations Pilgrim's Pride!

Three **Illinois Section Operator Training Courses** were held this Fall. On October 16, the first Operator Training Course was held at the Downers Grove Sanitary District, which covered the **Fundamentals of Preliminary & Primary Treatment**. The second training was held on October 24 and covered the **Purpose & Fundamentals of Wastewater Treatment**. This event was held at the Urbana & Champaign Sanitary District. The third training was held on November 13 at the Bloomington Normal Water Reclamation District (Southeast Plant), and covered the **Fundamentals of Anaerobic Digestion**. All of these Illinois Section operator-training courses were well attended, and the hope is that someday, these training sessions can be expanded to both Minnesota and Wisconsin. Congratulations again to **Mike Holland** for organizing all of these training events.

The **Minnesota Section** held their first **Annual Effective Utility Management Workshop** on August 28 in Minneapolis, as well as a **Cycling, Stormwater, and Suds Tour** on September 19. The MN Section also conducted their **Collections Workshop** with the Minnesota Wastewater Operator's Association (MWOA). The event occurred on September 25 and was held at the Western Lake Superior Sanitary District (WLSSD) facilities in Duluth. The event was well attended. The MN Section also held their **Annual Conference on the Environment (COE)**, in association with the Air & Waste Management Association (A&WMA), Upper Midwest Section, on Thursday, November 7. The event was held at the Minneapolis Convention Center in downtown Minneapolis. The conference again was well attended, and focused on numerous important environmental topics including wastewater, water, stormwater & water resource management, solid waste, and air. Congratulations go out to **Tim Wedin** (CSWEA) and **Andrew Willing** (A&WMA) for co-hosting this event, as well as all the members of the local arrangements committee for again organizing a terrific event.

The **Wisconsin Section** conducted several seminars and/or events this fall. The first was the **Lift Innovation and Technology Tour**, which was held on September 19 at the Fond du Lac Wastewater Treatment & Resource Recovery Facility. The Wisconsin Section held an **Emerging Contaminants in Water and Wastewater** event at Marquette University on October 22. The Wisconsin Section held an **Operations Seminar on Phosphorus and Nutrients** on November 14 in Oshkosh; and an **Industrial Pretreatment Seminar** on November 19, 2019 in Green Bay. The Wisconsin Section also held a **Stormwater and Watershed Webinar** on November 21, 2019 in Milwaukee. These events were well attended.

While it is now Winter, there are several activities/functions that are planned for the coming months. Please take a look at the list below of great educational and social events already in the works and begin planning to attend:

- **MN Section Collections Workshop w/ MWOA,** Twin Cities – MCES Regional Maintenance Facility, Eagan, MN, January 22, 2020.
- **MN Section 37th Innovative Approaches to Wastewater Operational Problems,** St. Cloud, MN, February 4, 2020.
- **WI Section Government Affairs Seminar,** Fond Du Lac, WI, February 20, 2020.
- **2020 AWWA/WEF YP Summit,** Anaheim, CA, February 24, 2020.
- **WEF 2020 Residuals/Biosolids Conference and Stormwater & Green Infrastructure Symposium**, Minneapolis Convention Center, Minneapolis, MN – March 31 – April 3, 2020.
- **Midwest Student Design Competition**, Monona Terrace, Madison, WI – April 6, 2020
- **25th Annual Education Seminar**, Monona Terrace, Madison, WI – April 7, 2020
- **93rd Annual Meeting**, RiverCenter Convention Center, St. Paul, MN – May 18-20, 2020

Information for these upcoming events can be found on our website, *www.cswea.org*. These events are valued by CSWEA members, as well as by many other distinguished professionals, wastewater pioneers, operators, manufacturers, professors, and students throughout the region.

See you in the spring.

"While it is now Winter, there are several activities/functions that are planned for the coming months."

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Remembering Jim Shaw

Rest in Peace, Influent Integrator

I met Jim Shaw when I was attending Central States over 20 years ago. Jim Shaw and Carol Strackbein were the head of the exhibit, manufacturers and consultants committee, and invited me to join them. I did not realize then how much being a part of that group would change my life.

Jim was a mentor and like a second father to me. He was not shy about expressing his opinions. Jim felt an obligation to pass along his wisdom and for that I am forever grateful. The key was to listen to and take the advice he offered. A high-quality individual, he was as knowledgeable and as respectful as they come. Frankly, I was honored and often questioned why he chose to align himself with our company over 15 years ago. I believe he saw a young company that he could have a great effect on, a company he could assist in growing as a business in the right way. The Jim Shaw way.

In 1992, Jim received his shovel. This shovel is awarded by the members of Central States for contributing a great amount of unrecognized time and effort to the organization. In 1997, addition, Central States awarded Jim the Service Award. He had an incredibly strong work ethic and he led by example. He chose to be heavily involved in our organization and, in doing so, encouraged many others to do the same.

Jim became the 'Influent Integrator', which was a role he excelled in. I always respected the fact that he enforced the wearing of the shovel at the many CSWEA events.

Take care my friend.

Tom Mulcahy

Memories from the Industry

"I met Jim when I began my career with Sanitaire over 40 years ago. Imagine! Time flies when you are having fun. He was my mentor, my brother, my friend, and also at times my antagonist. Jim had the knack of loving people and being concerned with their welfare. He never forgot a face or a friend. We worked together with very dedicated employees at Sanitaire to build it from a small company with 12 employees to the large international company it is today. The stories I could tell would fill a book. Jim will always be a part of my life and heart. Thanks, Jim, for all the good times and for all the memories. God bless and rest in peace."

– Carol Strackbein, former CSWEA President, Section Chair, Secretary, Treasurer.

"I'll always remember Jim's excellent sense of humor. As part of our 7S meetings, the first order of business is a motion to impeach the current influent integrator. When Jim was in that position, he not only took that with good humor, but also was often prepared with a great comeback. Same for the short jokes. Someone who knew Jim well noted he was a professional engineer, not in the context of a PE license but truly handled himself professionally with protection of the public and the profession as priorities. I never heard him speak poorly of another professional. He would express his opinion but never in a fashion to denigrate the other person or their firm."

– Rusty Schroedel, former CSWEA President, Section Chair, and WEF delegate.

"I met Jim over 30 years ago and immediately liked him for his great sense of humor, his good-heartedness and his welcoming manner which made me and others feel like they belonged to our great water profession. The thing that most impressed me about Jim was his faithful never-ending efforts to convert and keep people in our water sector. I feel that because Jim reached out to so many of us that he is still with us connecting people. He will be remembered as a legend in our organization. Jim will be greatly missed."

– Joan Hawley, former WI Section Chair and WEF Board of Trustees.

The Power of Volunteers

By Mohammed Haque

The tail end of 2019 brought together an amazing show of volunteerism, ambition and growth for our association. With WEFTEC in our backyard, I was amazed by our volunteers **Stephanie Cioni**, **Amanda Sheposh**, **Joe Lapastora** and **Liz Heise**.

They had a blast at Waterpalooza, held at Mario Saucedo Scholastic Academy in Chicago as part of WEFTEC. Our display, created by Stephanie and her husband was a working sewer collection system, with a lift station! How Cool. It was a huge hit for the kids. Thank you to these amazing volunteers who got to teach kids about how wastewater makes it's way from their homes to resource recovery facility.

WEFTEC was not short of amazing. A big hats off to our amazing Operations Challenge Team that got first in the Process Control event. These guys remind us why so much innovation in process control comes from facilities in the Midwest. We've got the brains! Read more about them in our WEFTEC wrap up. If you ever run into a process control issue, I'd make sure to call the CSWEA Shovelers, Coach **Chris Lefebvre**, **Brent Perz**, **Brandon Stall**, **Jason Robbins** or **Wade Lagle**. Best in the nation….. just saying.

If that wasn't enough, our Pumpers (Coach **Marc Zimmerman**, **Joe Watson**, **Aaron Beery**, **Brian Schoenecker** and **Mark Knuth**) came in 4th place in the Laboratory category and our amazing powerhouse of a student design team from Milwaukee School of Engineering came in 4th place in the Environmental Category. Way to go **Guissel Davilla**, **Christine Boland-Prom**, **Jamie Sykora**, **Sydney Shaffer**, **Miranda Durbin**, **Rachelle Montavan** and **Alexis Countryman**. Read about all of our WEFTEC activities later in this issue.

After WEFTEC, a group of Global Water Stewardship volunteers went to have the first GWS student design competition in Costa Rica. The TEC University competition featured three student design teams who presented their treatment plant designs for La Fortuna and the area around the Arenal Volcano. The excitement of the winning team was priceless to see.

A big thank you to Professor Diana Zambrano and her amazing students and also thanks to our judges **Laura Torres**, **Mike Holland**, **Liz Heise**, **Megan Livak**, **Paige Peters**, **Guissel Davilla** and **Mike Pepin**. We are looking forward to starting the first WEF Student Chapter in Costa Rica at TEC University and work

is on the way to make that a reality in 2020. We are also looking forward to having the winning student team and Professor Zambrano at the first Midwest Student Design Competition on April 6 in Madison, WI.

The trip also saw a continuation of our ongoing support for the 'Water's Worth It' campaign featuring the amazing storybook by **Lori Harrison** of WEF. The book, especially the Spanish version was a great hit. We did several readings. A big thank you to Megan Livak and Lori Harrison for all the support we have received and a big Gracias for the Spanish version!

Later in 2019, Stephanie Cioni had a great idea for a Water's Worth It Essay Contest aimed at Middle Schoolers. She put together a flyer and has done a lot of reaching out to various school Districts. The essay contest has been launched in Illinois and Wisconsin and we are amazed by the number of kids that have submitted essays.

The year 2020 and our future of water both hold a lot of promise and if you want to get involved, I encourage you to reach out to me and let me know of your great idea. If it moves water forward, we will go with the flow. CS

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APRIL 6
2020

1ST ANNUAL

MIDWEST DESIGN COMPETITION

The Central States Water Environment Association 2020 Student Design Competition

Monona Terrace | Madison, WI

Greetings,

I would like to introduce you to the Midwest Student Design Competition sponsored by the Central States Water Environment Association (CSWEA) and Global Water Stewardship (GWS). This year, the CSWEA and GWS competitions will be held Monday, April 6, 2020 in Madison, WI at the Monona Terrace Convention Center. This is a unique opportunity for students at the college level to demonstrate their engineering skills and practices by researching and preparing a design for a water quality-based project and presenting their project to water industry professionals.

There are two Student Design Competitions, described in detail on the attached announcements:

WEF Student Design Competition: For the WEF Design Competition, there are two different categories that student can compete in; Wastewater Design and Environmental Design. The competition at the CSWEA (WEF Member Association) level is intended to feed into the national competition at the annual WEFTEC conference, which this year is scheduled for October 3-7, 2020 in New Orleans, LA. Winning teams will receive a stipend of up to $1,000/student for travel and lodging expenses to attend the WEFTEC conference.

GWS Student Design Competition: The GWS Design Competition requires teams of students to design and present a project meeting the requirements of the real-life problem statement titled Global Water Stewardship: La Fortuna, Costa Rica. Winning teams will receive a stipend of up to $1,000/student for travel and lodging expenses to accompany GWS representatives on their August fact-finding trip to Costa Rica.

CSWEA has budgeted funds to assist individuals or teams to present at the WEF and GWS competitions in April. We understand it is hard to schedule students to participate and will be as flexible as possible in working with students and professors to afford the opportunity to participate on the design competition date. Design projects from 1st semester are eligible along with Design projects that are being developed as part of a 2nd semester class. Please read over the attached announcements and provide this information to any interested students in the water quality field that you feel may benefit from such an experience.

I look forward to hearing from you with any questions or if you need additional information on how to participate in these events. I can be contacted by phone at 815-762-5919 or email at *mholland@kishwrd.com*.

Best Regards,

Mike Holland, CSWEA Student Design Competition Chair

2020 MIDWEST DESIGN COMPETITION

COMPETITION GUIDELINES

INTRODUCTION: The Midwest Student Design Competition is intended to promote 'real world and hands on' design experience for students interested in pursuing an education and/or career in water/wastewater engineering and sciences field. This year, the Midwest Student Design Competition will be on Monday, April 6, 2020 in Madison, WI at the Monona Terrace Convention Center. This is a unique opportunity for students at the college level to demonstrate their engineering skills and practices by researching and preparing a design for a water quality-based project and presenting their project to water industry professionals.

There are three categories of Student Design Competitions available for students:

- WEF Wastewater Design
- WEF Environmental Design
- Global Water Stewardship (GWS)

WEF Student Design Competition: The Water Environment Federation (WEF) categories at the Midwest Student Design Competition, feed into the national WEF competition at the WEFTEC conference on October 4, 2020 in New Orleans, LA. The WEF competition requires teams of students to design and present a program meeting the requirements of a problem statement, developed by the students. **There are two levels of competition**; a conventional Wastewater Design category, which includes traditional wastewater design projects, and an Environmental Design category, which would include contemporary engineering design topics like sustainability, water reuse, wetland construction and Engineers Without Borders projects.

The WEF Student Design Competition is designed to be a function of the WEF Student Chapters program however being part of a WEF Student Chapter is not required to compete at the Midwest Student Design Competition. However, the winning teams will have to ultimately be WEF student members to participate in the national WEF competition at the WEFTEC conference.

Global Water Stewardship Student Design Competition: The GWS category at the Midwest Student Design Competition requires teams of students to design and present a project meeting the requirements of the real-life problem statement for the town of La Fortuna, Costa Rica titled *Global Water Stewardship: La Fortuna, Costa Rica*. Winning teams will receive a stipend of up to $1,000/student for travel and lodging expenses to accompany GWS representatives on their August fact-finding trip to Costa Rica and to present their project to local community representatives.

WORKLOAD: The project should include a problem statement, a development of alternatives and a recommended solution. The depth of the effort should be comparable to preliminary design. A key criterion in the judging of the competition is the manner and level of effort spent in evaluating the alternatives. Students are expected to work with little assistance from an advisor and/or professor, and the students are expected to work together as a team to find a solution to their problem. Students may use whatever references or resources they choose.

REQUIREMENTS: Teams may consist of more than four members, but only four students may present at the competition. Student teams will compete through oral presentations, in PowerPoint format. Each presentation will be 20 minutes followed by a 10-minute question and answer period.

The winning teams of the WEF competition categories will be required to submit a design notebook complying with the WEF competition requirements set forth in the WEF design competition entry guidelines. These guidelines will be provided to competitors when published, usually in May.

TIMELINE: January 31, 2020: Submittal of the entry form for the 2020 Student Design Competition is due. Submit to Mike Holland at *mholland@kishwrd.com* or online at *www.cswea.org/students-yps/design-competition*.

April 6, 2020: CSWEA Design Competition will be held in Madison, WI at Monona Terrace.

October 3-7, 2020: The winning teams from the WEF Competition will be offered the opportunity to compete at WEFTEC 2020 in New Orleans, LA.

SELECTION: Representatives from wastewater industry will judge the design competition. The results of the competition will be issued to participants at the conclusion of the competition.

AWARDS: WEF Competition Categories: The winning teams (max. of four members) from each category of the WEF competition will receive free registration from WEF to the WEFTEC conference in New Orleans, LA (October 3-7, 2020). Stipends for travel and lodging expenses to New Orleans vary depending on the student's respective WEF Member Association (MA).

Prizes for the winning team at the national WEFTEC conference will vary depending on sponsorship opportunities. Monetary awards typically provided by WEF for the top four design teams are: 1st place $2,500, 2nd place $1,500, 3rd place $1,000, and 4th place $750.

Global Water Stewardship Category: The winning team (max. of four members) from the GWS category will receive a travel and lodging stipend of up to $1,000/student (which is typically sufficient to cover travel and lodging) to accompany the next GWS team trip to Costa Rica for site analysis and investigations.

ARRANGEMENTS: Many teams may wish to stay overnight the night before or after the competition. Each team that competes in the competition will be reimbursed up to $500.00 to cover travel and lodging expenses. Teams are asked to manage their own budgets and provide receipts for reimbursement. If teams need assistance in making arrangements, please contact Mike Holland at the below email address.

FOR ADDITIONAL INFORMATION, CONTACT:

Mike Holland
Midwest Student Design Competition Chair
Email: *mholland@kishwrd.com*

Water Environment Federation
the water quality people

New Year New WEF Update

By Tracy Ekola and Derek Wold

WEFTEC is the start of a new year for the House of Delegates. **Derek Wold** will continue serving a final year as a WEF Delegate and incoming Delegate **Tracy Ekola** will start her three-year term. A Delegate's WEFTEC experience starts bright and early on Saturday morning with a 7 am House of Delegates breakfast. This year, the breakfast featured *Table Talk* with delegates discussing the following topics:

1. What would each Delegate note about their MA and WEF relationship to WEF's new hire of a Senior Director of Association Engagement?
2. What MA and WEF collaborative activities provide the most mutual benefit for both organizations and our common mission?

This was a great opportunity to hear ideas from other MAs and share ideas and challenges. For example, we learned that the Kentucky and Tennessee MA changed their name to Clean Water Professionals of Kentucky & Tennessee. The common themes were that the biggest needs for MAs that WEF can assist with are to serve as an information hub for MAs, to provide membership/engagement assistance, and to prepare operator-training materials.

Saturday's meetings included reports from outgoing Speaker Keith Hobson, incoming Speaker Dean Miller, and incoming President Jackie Jarrell. We also had a chance to meet our new Executive Director, Walter Marlowe.

As part of the WEF Business meeting, **WEF's Five Critical Objectives** for the next year were introduced:

- Critical Objective 1: Develop and Engage Membership. New Director of Association Engagement, Lisa Ruane, was introduced.
- Critical Objective 2: Provide Broad Range of Professional Content and Programming. Topics discussed included the Fundamentals of Wastewater Treatment Vol. 1 Operator Training Manual, Operator Fact Sheet, and PFAs/PFOA issues.
- Critical Objective 3: Generate Increased Public Awareness of Value of Water (VOW). Discussion items included the *Brave Blue World* documentary film, *Why Water's Worth It* children's storybook, *Word on Water* podcast, and *Affordability Report to EPA*.
- Critical Objective 4: Innovative Technologies and Approaches. Highlights include the Joint WEF-WRF LIFT program, Workforce Diversity and Inclusion Task Force and InFLOW program.
- Critical Objective 5: Operate Sustainable Business. Current financial status and FY20 budget was presented.

WEFMAX 2020

All association leaders are encouraged to attend a WEFMAX to network, learn, and share experiences with other MAs. The locations for 2020 WEFMAXs are as follows:

- Jersey City, New Jersey March 25-27
- Honolulu, Hawaii April 15-17
- Charleston, South Carolina May 13-15
- Fargo, North Dakota May 27-29

Operator training and professional development has been a frequent topic at both the local and national levels. WEF recently created a professional operator program that was introduced at WEFTEC. Information on this program follows:

REIMAGINE CREDENTIALING WITH THE PROFESSIONAL OPERATOR PROGRAM

Two letters after a name can have a big impact on a career – just look at the RN or PE. Those designations add a level of credibility to the professional, impact their pay scale, and show they have the knowledge necessary to perform their jobs to the best of their ability.

With the support of the American Water Works Association (AWWA) and the Water Environment Federation (WEF), the Association of Boards of Certification (ABC) recognized the need for a similar designation that gives water and wastewater operators credit where credit is due.

Operators are front line protectors of human health, either through ensuring safe drinking water or the safety of waterways through effective wastewater management. They are the lifeblood of every community and deserve a way to be showcased as professionals. And so, built by operators for operators, the Professional Operator (PO) program was born.

JOIN A COMMUNITY

POs are an elite group of like-minded individuals, deeply committed to serving the public and growing in the industry. Having a supportive community for sharing industry knowledge is absolutely invaluable. The designation opens

doors for international networking, connects operators with opportunities to be industry advocates, and qualifies operators to attend some fun industry events along the way.

GROW AS A PROFESSIONAL

Becoming a certified PO signals to employers that the operator is an achiever – committed to their profession long-term and ready to go above and beyond.

"I became a Professional Operator because of the chance to test my knowledge and accelerate my career," said Brian Faist, Professional Operator in Rivergrove, Oregon. "The PO designation has made me a more appealing candidate for promotion."

Whether looking to grow within a company or trying to find a job, being a PO makes the operator stand out in a crowd.

ENSURE ACCOUNTABILITY

The PO program is the first internationally recognized professional designation for water and wastewater operators. With the designation, peers, customers, and the public can feel confident that a Professional Operator has mastered the most rigorous standards of their vocation and industry.

"I wanted a challenge and I tackled it!" said Georginna Lockett, Professional Operator in Atlanta, Georgia. "Being a PO certifies me in the industry as a top-level operator and that has been my goal since I started in the field."

All POs must also adhere to a code of conduct, which bolsters an operator's reputation and builds additional community trust.

INCREASE MOBILITY

Industry adopters of the PO program are continuing to grow and it's helping to mold an expansive future for operators.

"Broad acceptance of a standard certification can make water professional credentials portable across state or country lines," said Paul Bishop, President and CEO of ABC. "With many benefits and potential solutions also come some challenges, but industry leaders at WEF, AWWA, and ABC are up to the task."

The PO program is a great leap toward an industry credential standard. It includes uniform and transparent credentialing that is recognizable by any employer or certification body.

BEGIN YOUR JOURNEY

PO certification is offered to operators in four levels (from Class I through Class IV) for water treatment, water distribution, wastewater collection, and wastewater treatment. Joining the PO movement is simple and the entire process can take as little as a few weeks.

- **Step 1: Create an Online Profile**
  The path to becoming a PO starts by creating a profile at *www.portal.abccert.org*. An operator will be asked to add information like work history and education.
- **Step 2: Submit an Application**
  The operator submits an application and ABC reviews the operator's profile to ensure basic criteria have been met. Applications are accepted from anywhere in the world, any day of the year.
- **Step 3: The Exam**
  In some cases, operators may have already passed a certification exam that ABC will accept. If not, the operator will schedule a time to take an ABC certification exam. Once the exam is passed, the operator will receive a certificate, be invited to a POWER event to be formally recognized, and join the PO community.

For questions or additional information, please visit *www.professionaloperator.org* or email directly at *info@professionaloperator.org*.

The PO program is administered by the Certification Commission for Environmental Professionals (C2EP), an organization of volunteer water environment operations subject matter experts created by the Association of Boards of Certification (ABC). CS

PO PROFESSIONAL OPERATOR

ABC Association of Boards of Certification

Georginna Lockett from Atlanta received her Professional Operator certificate from Andrew Houlihan, Water Treatment Operations Commissioner for Halifax Water (Nova Scotia, Canada) at ACE18 in Las Vegas.

Brian Faist (left), a Professional Operator from Rivergrove, Ore., receives his PO certificate from Andrew Houlihan, Water Treatment Operations Commissioner for Halifax Water (Nova Scotia, Canada) at ACE18 in Las Vegas.

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Motivating Innovation

By Rachel Lee

Innovation in wastewater has been a perineal topic of conversation here in Wisconsin. Phosphorus removal has been a standard for over 20 years, which is quite unique, compared to much of the country. We also have a culture of utilizing technologies like anaerobic digestion. These days, conversations drift to low dissolved oxygen and nitrite shunt or PFAS. Thankfully the section and the association provide numerous opportunities to learn about the rapidly evolving alphabet soup.

The section hosted two seminars in November. The recent Phosphorus/Nutrients Operations Seminar featured several discussions on innovative technologies that have been evaluated and tested in Wisconsin including low dissolved oxygen, nitrite shunt, biological phosphorus removal optimization, deammonification, and others. The Operations Committee is doing a great job of putting together content that interests our members. The Industrial Pretreatement Committee hosted a seminar with presentations including safety, PFAS, Region 5 EPA's new pharmaceutical sewer ban, and talks from two industries in the area. The slides from this seminar will be posted to the CSWEA website soon. Also, please keep a heads up because the seminar will likely return to its traditional timing of August.

Our November Business Meeting was very well attended. Each committee provided updates on their status, and we passed our section budget. The budget continues to reflect our philosophy of conducting seminars that provide great programming while covering the expenses or generating a slight positive balance. We use those funds to support our young professional events, our operations challenge teams, our WEF student chapters, and the student design and Stockholm Junior Water competitions. We also discussed implementing a Memo of Understanding for the Energy and Resource Recovery Committee. This draft memo is included here for your review. Please provide any thoughts or comments to Lindsey Busch (*lbusch@carollo.com*). The final MOU will be included in the February section meeting agenda.

The Wisconsin Section YPs are planning two events this winter. A social charity fundraiser event and an event focused on working with manufacturer's representatives in the wastewater industry that is targeted for the spring. The YP group will also be soliciting applications for YPs to attend the YP Summit hosted by WEF in Anaheim, CA, in late February. The section would love to have a Wisconsin representative at the summit this year. If you are 35 or under or consider yourself to be relatively new to the wastewater industry, please reach out to our YP Chair, Emily Maher (*emaher@donohue-associates.com*), to get added to the YP email list. It's a fun and engaging group, and they are always interested in having people join the group.

Our section meeting will be on February 19 at the Radisson in Fond du Lac. It is the afternoon before the Government Affairs Seminar. It would be great to see some new faces at the meeting. See you there. CS

Memo Of Understanding

ENERGY AND RESOURCE RECOVERY COMMITTEE – NOVEMBER 2019

GENERAL UNDERSTANDING

The Wisconsin Section of the Central States Water Environment Association (WI Section of CSWEA) Energy and Resource Recovery Committee (Committee) will primarily serve as an information exchange resource to section members on all topics related to energy and resource recovery. In doing this the Committee will serve as a liaison to the CSWEA LIFT Committee, WI Section Biosolids Committee, and WI Section Operations Committee, among others. The Committee will also provide an annual Energy and Resource Recovery award to an entity or individual within Wisconsin, which will be presented at either the Biosolids Symposium or the Operations Committee Seminar.

SPONSORING ORGANIZATIONS

The WI Section of CSWEA will sponsor the Committee and annual award, including financial responsibility.

CONTRIBUTING ORGANIZATIONS

The WI Office of Energy and Innovation and Focus on Energy will serve in an advisory capacity to the Committee without financial responsibility.

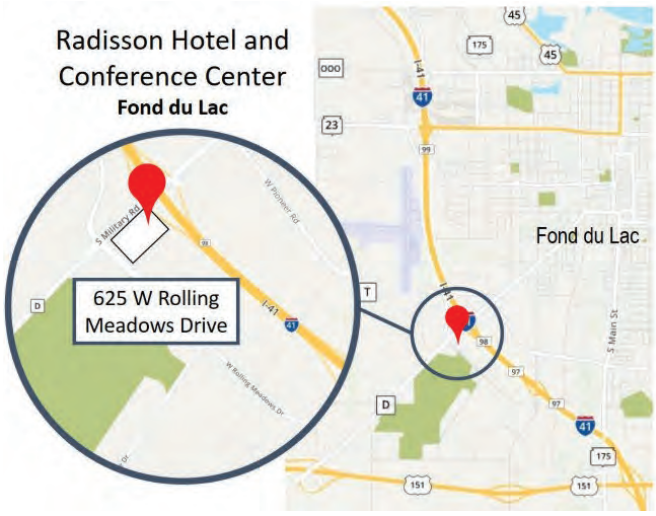
RESPONSIBILITIES

The following operating responsibilities and methods of operation are agreed upon by the sponsors:

1. The Committee will consist of at least three individuals and no more than 10 individuals, with one individual from either the Wisconsin Office of Energy and Innovation or Focus on Energy.
2. The Committee roles will include: Chair, Vice Chair, LIFT liaison, Biosolids Committee liaison, and Operations Committee liaison. One committee member may hold up to two roles at a time.
3. The Chair shall be responsible for organizing meetings, maintaining records, leading the award process, and reporting to the WI Section meetings.
4. The Vice Chair shall be responsible for all finances, accounting, and committee budgeting.
5. The LIFT liaison, Biosolids Committee liaison, and Operations Committee liaison shall participate in the respective calls of those committees and report updates back the Energy and Resource Recovery Committee.
6. Committee members will normally serve five years, with member appointments being made by each organization as soon as practical after conclusion of their respective term. The terms of committee members will be staggered to provide continuity.

Save the Date! February 20, 2020 Wisconsin Government Affairs Seminar

NEW LOCATION – FOND DU LAC RADISSON!



The CSWEA-WI Section, WWOA, Wisconsin DNR, League of Wisconsin Municipalities, and Municipal Environmental Group-Wastewater Division are finalizing plans for the next Government Affairs Seminar scheduled for Thursday, February 20, 2020 in **Fond du Lac**.

This seminar will have updates on familiar topics like phosphorus compliance along with plenty of 'breaking news'.

Agenda items include:

- A 'One Water' overview and perspectives from drinking water, storm water, and agriculture.
- What trends and patterns for phosphorus compliance are we seeing across the state?
- Water quality trading through a clearinghouse or using updated guidance – why this might be relevant to you in the future.
- Hiring, retaining, and training great employees in a changing work environment.
- Compounds of emerging concern like PFAS.
- A jam-packed DNR update on new, revised, and pending regulations.

The seminar will have something for everyone, whether your facility is large or small, and whether you are a regulator, operator, manager, or consultant. Experts will be available to field questions throughout the day.

We have a new location! The newly renovated Radisson Hotel and Conference Center, 625 W Rolling Meadows Drive, is on the SW edge of **Fond du Lac**. For reservations call toll free 1-800-333-3333 or 920-923-1440. Discounted and government rate rooms are available if reserved by January 27, 2020 if you ask for the 2020 Government Affairs Seminar room blocks.

Stay tuned for conference agenda and registration information, which will be sent by email and will be posted on CSWEA-WI (*www.cswea.org/wisconsin/events/upcoming-events*) and WWOA (*www.wwoa.org*) websites. Help us spread the news of the seminar to make this the best year ever!

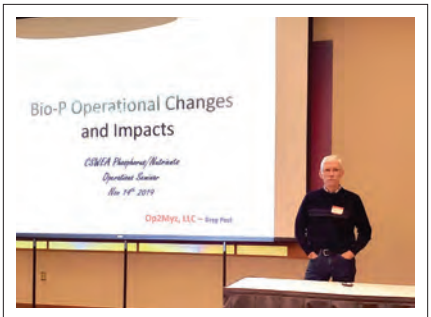
Wisconsin's Phosphorus/Nutrients Operations Seminar

By Sharon Thieszen

On November 14, the Wisconsin Section hosted a Phosphorus / Nutrients Operations Seminar at the Culver Family Welcome Center at the University of Wisconsin-Oshkosh. Close to 60 people attended the seminar. The seminar included technical sessions on nutrient removal challenges, lessons learned, and the changing regulatory landscape. Approximately two hours were dedicated to two 'bull sessions' where attendees had the opportunity to discuss the topics presented and share their experiences on nutrient removal challenges or other operational concerns and opportunities.

Leon Downing of Black & Veatch, kicked off the seminar by discussing *Innovative Solutions to Today's Nutrient Removal Challenges*. Leon's engaging presentation covered the drivers for innovation in the wastewater industry including removal and recovery of nutrients and how we have had to learn to do more with less (Federal Funding is at pre-*Clean Water Act* levels). Past wastewater treatment innovation focused on new pieces of equipment and new reactors. Today the water resource recovery industry is focused on developing a deeper understanding of the complex microbial and chemical interactions involved with nitrogen and phosphorus cycling, and then using this knowledge to develop new operating approaches for biological nutrient removal. The result is innovation focused on operation and control, and not necessarily huge advances in equipment and mechanical components. Leon focused on three nutrient removal technologies including:

- Granulation – aerobic granular sludge (AGS), which settles faster and takes less capacity than the traditional activated sludge process. Membrane Aerated Biofilm Reactor (MABR) which supports biofilm growth on oxygen-supplying membranes and total nitrogen removal while significantly reducing energy and the capacity needed, compared with traditional wastewater treatment methods.
- Biological Phosphorus removal with Ammonia Based Aeration Control (ABAC), which ties dissolved oxygen to an ammonium reading and allows for increased energy efficiency and low effluent phosphorus.



Matt Seib of Madison Metropolitan Sewerage District (MMSD), led the next presentation on *Lessons Learned from Several Years of Low Dissolved Oxygen and Nitrite Shunt Pilot Evaluations*. Matt shared MMSD's work with partial nitritation/denitritation processes to reduce energy demands and enhance treatment. He pointed out that while these processes potentially offer benefits, they also come with challenges. MMSD's pilot work provided insight into factors such as impacts of low winter temperatures, changes in SVI, effect on biological phosphorus removal, and minimum dissolved oxygen requirements. Matt's presentation spurred discussion amongst the operators on the added challenges Wisconsin winters bring when optimizing treatment processes.

Greg Paul, OP2MYZ, discussed the *Bio-P Operational Changes and Impacts*. Greg shared first hand experiences from Wisconsin operators on challenges and successes optimizing their enhanced biological phosphorus removal (EBPR) processes. He focused on applied principles and what has been uncovered through careful observation relative to oxidation reduction potential, pH, alkalinity, dissolved oxygen, solids retention time control, and inline fermentation. Greg emphasized the importance of getting back to the basics of documentation and keeping detailed logs. He also strongly encouraged operators to share information and experiences with each other to broaden their understanding of the operating EBPR principles, as well as, enhance their knowledge base of operational optimization tools. A perfect segue for what was to come.

The bull sessions provided a forum for discussion of the operation and maintenance issues related to phosphorus and nitrogen management practices in the wastewater treatment field. The attendees split into multiple groups for the bull sessions. A list of questions and topics were provided to start the discussions and a scribe was selected by each subgroup to report back to the full seminar group on the highlights from their discussion. The bull sessions provided a great opportunity for operators to share their experiences and concerns with others and take some new ideas back to their facilities.

The UW-Oshkosh catered lunch and then Cody Schoepke of Fond du Lac Wastewater Treatment & Resource Recovery Facility (WTRRF), presented on *Five Years of Phosphorus Removal Optimization – What Do We Know?* Cody shared the steps and process that Fond du Lac used to improve the phosphorus removal at their WTRRF. These steps included chemical feed control and dosing, basin modifications for Bio-P, chemical and tertiary treatment piloting, deammonification, and other process items. Cody emphasized the importance of planning and preparing to optimize their phosphorus removal in advance of receiving the total maximum discharge loading (TMDL). The planning and pilot studies helped put the Fond du Lac WTRRF in the best possible position to achieve their future limits.

Paul Kent of Stafford Rosenbaum LLP, wrapped up the presentations before the final bull session with an informative presentation entitled *Update on Regulatory Options for Phosphorus Compliance: A Changing Landscape*. Paul gave a brief history of the phosphorus regulations in Wisconsin and noted that Wisconsin was once again ahead of the curve in clean water regulations when they implemented phosphorus discharge limitations. The high treatment costs for phosphorus removal in 2010, helped pave the way for the alternative regulatory compliance options, i.e., Adaptive Management and Water Quality Trading. Paul discussed how the alternative regulatory compliance options are working, the impact of the TMDLs, the impact of staff changes at the Environmental Protection Agency and the Wisconsin Department of Natural Resources, and the potential for a trading clearing house. CS

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Collaboration and Inclusion Equal Environmental Wins

By Patrick Haney

This past fall the Minnesota Section was a buzz with activity. In September, we conducted our Fall Collections System workshop in Duluth. Additionally, our stormwater committee hosted its annual Cycling, Stormwater, and Suds tour. In November, we hosted the 36th Annual Conference on the Environment. Laura Bishop, the new Minnesota Pollution Control Agency Commissioner provided a great opening discussion about the Governor's environmental initiatives. The conference was well-attended. In December, the City of Rochester in conjunction with the R2E Committee, hosted an open house highlighting their recent pilot testing of Orege SLG System. The City generously provided lunch, tours, and highlights of the pilot testing results.

While at the Conference on the Environment, I had the opportunity to speak with a WEF Delegate from Kansas City Water. While our conversation was brief, we spoke about Missouri's regulatory approaches, Point Source to Non-Point Source nutrient trading, and the idea of bubble permit's amongst multiple utilities within the same watershed. These regulatory approaches allowed utilities in the area to find cost effective approach to treatment and nutrient management that provided an overall financial and environmental "win" for all stakeholders.

In Minnesota, the MPCA and communities along the Minnesota River have engaged in healthy dialogue through the Minnesota River Ag-Urban Partnership Forum. The group includes a discussion of both environmental, wastewater infrastructure agricultural, and financial challenges. The goal of the group is to find collaborative approaches to improving the water quality of the Minnesota River through shared understanding of stakeholder challenges, innovative solutions, and move initiatives forward that maximized public investments. The approach is much different than dictated effluent standards based on Total Maximum Discharge Limits, River Eutrophication Standards, Waste Load Allocations, or other regulatory driven improvements at wastewater plants. I strongly believe that the collaborative efforts of the MPCA, farmers, cities, and environmental groups will lead to better environmental results.

At the end of the day, most of us are environmentalists. We want clean food, clean air, clean water, and an overall clean environment. How we get there, how we pay for it, and how we communicate is often the challenge.

In addition to collaboration, inclusion and diversity are key to the success of our environment. Our CSWEA community consists of a wide range of genders, gender identities, sexual orientation, races, religions, and cultures. Still, we need to make sure we're casting our net as wide as possible to bring in fresh ideas, perspectives, and approaches to our greatest environmental challenges. For example, while Andrew Benedek of Zenon is widely credited for taking the MBR concept from an idea to a commercial product, Professor Kazuo Yamamoto and his team at Tokyo University were first to present study results from submerged hollow fiber membranes within the bio reactor. Moving forward, I'm proud to note that Ashley Hammerbeck, Vice Chair of the Membership Committee, has taken a leadership role to help make the MN Section more inclusive. We're taking steps forward to make sure that our wider wastewater community has access to our committee meetings that are often conducted via conference call. She's also working on a centralized cloud-based location for Section documents and collaborative efforts. Finally, she's working with the Inclusion and Diversity Committee at the MN Section of AWWA to help implement best practices and lessons learned through their efforts.

This winter and spring, our Section remains dedicated to serving our states Water Resource Recovery Facilities, Cities, and Utilities. We'll host the winter Collection System Workshop on January 22 at the Metropolitan Council Environmental Services Regional Maintenance Facility. In February, the Innovative Approaches to Wastewater Operational Problems Workshop will be St. Cloud and our Section will conduct an outreach event at the University of Minnesota School of Engineering during E-Week. Last year

"It's been a rewarding summer and I hope members continue to engage, learn, and have fun in the coming months."

the Innovative Workshop was widely successful in its new location at the St. Cloud Rivers Edge Convention Center and we're looking forward to another strong workshop on February 5 this year. In April, the MN Section and Central States at large will be hosting the WEF Residuals and Biosolids Conference at the Minneapolis Convention Center. I've attended this specialty conference in the past and I'd highly recommend attending. The conference includes high quality and innovative presentations about biosolids treatment and management issues. I'd be surprised if PFAS wasn't a major topic of discussion at this year's event. The Central States Annual Meeting will be at the St. Paul River Center May 18 through May 20. The River Center will be a new location for the Central States Annual Meeting, in response to the growing attendance at this event. The MN Section will host the golf event at Top Golf this year to further promote a fun social, interactive, and collaborative event that can be enjoyed by those of us with a strong hook or slice. CS

ABOVE: During the CSWEA/MWOA Fall Collections System Workshop, Al Parrella, explains pump operations during the WLSSD Pump Systems Tour

CYCLING, STORMWATER, AND SUDS

By Mark Doneux, Chair, Minnesota Chapter Stormwater Committee

The Minnesota Stormwater Committee held their Cycling, Stormwater and Suds bike tour on Thursday, September 19. The group of 18 toured stormwater and watershed improvements in Minneapolis along Minnehaha Creek. The guided, eight-mile bike tour on the Minneapolis Parks trails followed along the creek, Lake Nokomis, and Lake Hiawatha included stops to learn about:

- Maintenance of stormwater BMPs and native plantings.
- Stream restoration.
- Managing watersheds with an increasingly wet hydrologic regime.

The group also encountered an illicit discharge into Minnehaha Creek that was caused by a contractor doing water main work. The water main apparently was damaged during our tour and caused the excavation pit to overflow carrying sediment laden water into Minnehaha Creek. Several tour members, including one from the City of Minneapolis Public Works, spoke with the contractor to ensure a speedy repair to reduce impacts to the Creek. Following the tour, the group enjoyed a refreshing beverage at Venn Brewing.

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Getting the Message Out, Wastewater Funding Matters

By James Kerrigan

What is the one thing that we all have to deal with? We always hear the old saying, learn to do more with less. Budgets keep getting tighter and it is not a trend that appears to be going away, especially in this industry. Everywhere you look these days, you hear about government needing to invest in infrastructure, and yet when one thinks of infrastructure, you don't think of the sewers and the role we all play in this most critical industry. To the public eye, wastewater is a second thought something that is not spoken about daily, and when the public thinks of infrastructure what springs to mind are the highly visible roads, bridges, schools, airports, and electrical systems. Perhaps the most exposure sewers have seen in recent times is from the home of the Teenage Mutant Ninja Turtles, under the streets of New York, and no matter how popular that show was we still know it still didn't do this mighty entity (sewers) justice. Think of some examples, like Chicago, where it was recognized that if a city doesn't have a good sewage treatment system it would literally poison itself, and the huge effort that was made to build the sanitary and ship canal to protect Lake Michigan, the city's water supply from pollution.

When I say I am a civil engineer, the first thing that comes to peoples mind (after they think it means I am polite) is that I work on "roads, bridges, and stuff"; the things people see. They don't think of the huge network of underground infrastructure, and why should they if it's out of sight, it's out of mind. But once the sewer backs up, the water gets shut off, they realize quickly how important these things are to our lifestyle. But as soon as things go back to normal, we're forgotten. The old saying you don't miss it until its gone cannot be more true to our line of work.

So why is that? We are obviously not doing a good enough job of getting the word out about what we do and why it is important. We all see water shortages and poor sanitation in poor countries, and as populations grow, the need for sanitation grows also, and the need for our line of work is becoming more and more crucial.

Why is it important to get the word out now for us here in the Midwest? I could bore you to death, but here are a few reasons I feel are important as someone who is not native to this country, and whose homeland has been making strides recently towards where we in the Midwest have been for decades.

If we are to make ourselves known and to gain recognition we need, we have to begin the transition away from being an afterthought utility, and become an example of how to do something with nothing. We've all heard the phrase "Water Resource Recovery Facilities" as a way of better explaining what we do. While this sounds like a buzz word, and as someone who hates making a name for something so it has a cool acronym, it does have some meaning. It hints at the opportunity we have using the material that flows through our facilities every day.

We need to demonstrate that wastewater is a resource rich in potential opportunities, and with the current state government we have a great opportunity to get more out of our facilities while doing our job of protecting the environment; doing it better, more efficiently, and showing our leadership the three R's of reduce, reuse, recycle.

The problem is how do we do what we need to do and how do we get the funding needed.

The recent infrastructure bill is an obvious place to look for funding. $85 million in the capital bill was directed toward IEPA with the goal for this funding to deal with unsewered areas. Other funds have been directed toward the SRF loan fund. These investments are a direct result of wastewater professionals and IEPA staff making the case for funding needed wastewater projects. But we can't stop there because this is clearly not enough. Making the use of those funds a success will help in continuing to push for more wastewater funding for other projects.

So, where do we get funding traditionally? Raise rates? Nobody likes that, but this is does generate a steady, ongoing source of money. Low interest loans? Yes, the typical route, but not always the best option depending on the project. Bonds, use reserves? But it depends on how fiscally responsible our predecessors were.

But look also at where we have opportunity for some funding from the resource that we see every day. There are numerous avenues that some of us already have tapped and are having success, and others that are not. Think of all the topics that are presented at every wastewater conference; biogas utilization, nutrient harvesting, fertilizer, cogeneration, irrigation, tipping fees, etc. – the list goes on. We've all heard these and we need to look into these as options for our own facilities. Yes it may take time to get pay back, but the wastewater will keep flowing. These projects also have the benefit of allowing us to tell our story to our communities – making us less "out of sight, out of mind."

Where can we increase efficiencies in our facilities? We all see the ComED energy efficiency programs that are out there, and is there still grant funding for the use of high efficiency equipment? We need to do some searching to see what is available but also sometimes the answers are presented to us. **When and where should we start do you ask?**

Let me answer that question with a question. Do you, or do you know someone that likes BEER? The CSWEA IL Section Biosolids, Energy, and Environmental Recovery (B.E.E.R.) was earlier this month and provided the perfect setting to learn from others on what worked for them. After that the CSWEA annual conference is another opportunity to learn and share what we know or want to know.

Who can provide this knowledge? The registration for the annual conference is open, and this is the obvious place to allow you to share your experiences, good and bad. To me the bad experiences are what we learn most from, and we need to share those with others so that we all benefit.

Lastly to highlight one event that epitomized this concept was the IL Section Operations Seminar last month at the Fox River WRD. This was a great success, and if you were not there you missed out. Some fantastic knowledge shared on operations, data collection, and how everyone from management to engineers to operators can use the same data differently to suit their needs. The seminar was an example of an interactive, low pressure environment where ideas and knowledge flowed, and showed how two way learning, with information coming from both the audience the presenters benefited everyone there. I know for a fact that a couple of the presenters actually learned more about their own topic during the seminar because of the audience input.

As always stay tuned to CSWEA's website for the next upcoming events, including the next section meeting: *www.cswea.org/illinois/events/upcoming-events*.

Go n-eiri an bother leat!

James CS

> "I know for a fact that a couple of the presenters actually learned more about their own topic during the seminar because of the audience input."

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CENTRAL STATES WATER ENVIRONMENT ASSOCIATION

OPERATOR TRAINING PROGRAM

PURPOSE

The CSWEA Operator Training Program is intended to recognize a person's commitment to professionalism, continual improvement, and ability to finish a long-term task. This will help Operators prepare for their respective state's Wastewater Operator Certification Programs. It is also a separate acknowledgment of the completion of a training program consisting of top-notch materials and instructors.

WHO WILL BENEFIT FROM THIS PROGRAM?

Employers and supervisors will by having a way to fast track new staff members who are new to the water resource recovery industry. It will also help them identify employees and potential employees who are serious about a career in the profession, and are willing to invest in themselves for the future. A benefit for individuals will be the ability to differentiate themselves from other candidates when seeking promotions and/or new jobs, and to be able to take pride in an important professional accomplishment.

CSWEA CERTIFIED OPERATOR REQUIREMENTS

To become a CSWEA Certified Operator, you will need to attend a minimum of eight CSWEA Courses from the prescribed list included below in a period of no more than three years. In addition, you will need to attend one seminar from the list of seminars below. Once you are a CSWEA Certified Operator, refresher courses are at no cost to you. The courses below will include a multiple-choice test (approximately 20 questions) that must be passed by the participant with a score of 80% before the course will fulfill the CSWEA Certified Operator requirements.

FACILITY HOSTING OPPORTUNITIES

Be a facility that takes advantage of the flexibility CSWEA has to run Basic Training Classes for relatively small number of participants (12 to 20). If your facility or municipality has a room that can hold a class that size or there is one nearby, you can reap the benefits of virtually no travel for your personnel. This class will be advertised to all CSWEA members so you do not have to fill the class with your own people. You can learn more about the program at *www.cswea.org* or email us at ***mholland@kishwrd.com***.

	IEPA CLASS			
COURSE	3&4	2	1	Collections
Purpose and Fundamentals of WW Treatment	X			
Health and Safety in Water Treatment Plants	X			
Wastewater Math I	X			
Wastewater Math II		X		
Activated Sludge I		X		
Activated Sludge II			X	
Preliminary and Primary Treatment		X		
Secondary Treatment			X	
Disinfection		X		
Solids Handling		X		
Anaerobic Digesters			X	
Collection Systems				X
Maintenance I	X			
Maintenance II		X		

SEMINARS

- CSWEA Annual Conference
- Education Seminar
- IL Section Operations Seminar
- IL Section Collections Seminar
- IL Section Energy Seminar
- IL Section Resource Recovery Seminar

CSWEA municipalities and resource recovery facilities realize the value of a talented, qualified knowledgeable operator to run our amazing facilities. The CSWEA Certified Operators program was implemented to ensure that we continue to have a talent pool for generations to come.

START TODAY

There is a $50 enrollment fee for the three-year program.

Each class costs $30-$50 based on the hosting facility costs.

To enroll, go to ***www.cswea.org***. CS

SAINT PAUL RIVERCENTRE™

93RD ANNUAL MEETING

MAY 18-20, 2020 | RIVERCENTRE, ST. PAUL, MINNESOTA

Future of Water

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Future of Water

93rd Annual Meeting Highlights

The 93rd Annual Meeting of the Central States Water Environment Association, Inc., will be held May 18-20, 2020 at RiverCentre in St. Paul, Minnesota. This year, we will be focusing on the next generation of water professionals as well as our continuing utility pricing, leadership and ethics sessions, operations track, and utility management track.

PAST TOPICS

OPERATIONS & MAINTENANCE:

- Efficiency (pumps, motors, lights, UV disinfection, HVAC, etc.)
- Technology/SCADA/Web-based Maintenance Programs/ GIS Applications
- Troubleshooting
- Case Studies
- Summary of Completed Projects
- Optimization
- Nutrient Removal
- Process Control
- Start-up Issues

UTILITY MANAGEMENT:

- Succession Planning
- Project Funding
- Utility Rate Development and Reviews
- Employee Retention
- Communication

ENHANCED RESOURCE & ENERGY PRODUCTION:

- Resource Recovery – Raw Materials, Nutrients, Energy
- Digester Gas Production Technologies
- Co-digestion
- Heat Recovery Technologies
- Alternative Energy Use

RESIDUALS, SOLIDS, & BIOSOLIDS:

- Environmental Management Systems
- National Biosolids Partnership
- Standard or Advanced Treatment and Stabilization

COLLECTION SYSTEMS:

- Collection System Rehabilitation Technologies/Methods
- CMOM Program Development and Implementation
- Collection System Design and Operation
- Green Infrastructure – Examples in Practice
- Infiltration/Inflow Management
- Stormwater & Combined Sewer Overflow Management

GENERAL:

- Laboratory Issues/Bench-Scale Studies
- Pretreatment, Industrial Treatment, & Pollution Prevention
- Regulatory Issues
- Security Issues
- Engineering Ethics Training

WATERSHEDS & STORMWATER MANAGEMENT:

- Anti-Degradation and Other Regulatory Issues
- Habitat or Groundwater Protection or Restoration
- Non-Point Pollution Source Modeling
- Water Quality Trading and Watershed Management Issues and Initiatives, including Adaptive Management
- Green Infrastructure Solutions and Best Management Practices
- Total Maximum Daily Loads Involving Point and Non-Point Sources
- Education and Outreach

SOFT SKILLS/LEADERSHIP:

- Leadership Skills
- Managing the Ill or Injured Employee
- Anti-Harassment and Discrimination Training for Managers
- Getting the Most Out of Employee Performance Evaluations
- We Negotiated the Agreement – Now What?
- Handling the Grievance and Arbitration Process
- Managing in a Union Environment
- The Basics of Labor Law
- 10 Things Every Manager Should Know About Labor Law
- Top 10 Employment Law Issues
- Stumbling into Violations: Do Hand-books and Policies Violate Labor Law?
- Management Rights for Managers
- Social Media and the Workplace

RESEARCH & DESIGN:

- Nutrient Removal Technologies
- New/Innovative Technology Research and Application
- Sustainability in Design and Construction
- Toxics/Emerging Pollutants Monitoring and Control
- Treatment Design
- Wastewater Reuse, Applications, Technology, & Regulatory Issues CS

GREATER Innovation, Improvement and Excellence in St. Cloud

By Emma Larson, Liz Kramer, and Shanna Czeck

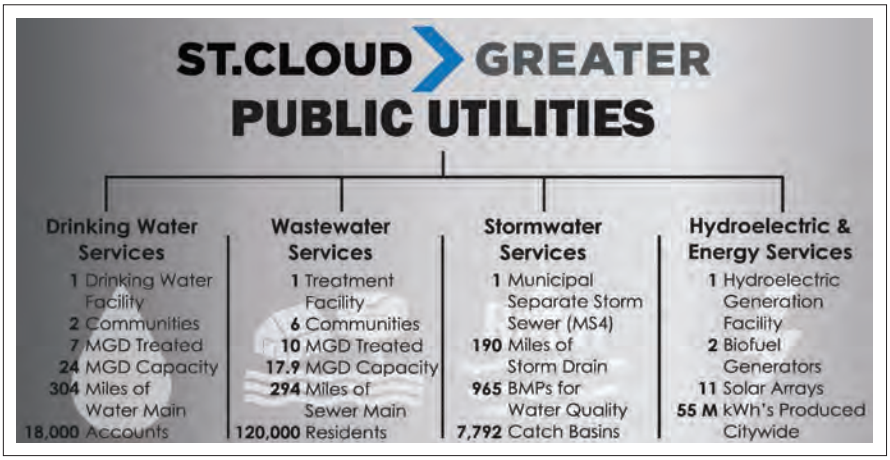
The phrases 'Excellence in the Delivery of Public Service' and 'Passion for Clean Water and Resource Recovery' have two things in common – they are the overarching mission and vision of the St. Cloud Public Utilities Department and they are clearly reflected in all department facets, from the day-to-day operations to long-term goals.

INNOVATION > IMPROVEMENT > EXCELLENCE

The departmental vision of advocating innovation and continuous improvement in the services provided is well established. 'Finding a better way' is discussed and acted on daily. This mindset and culture is accepted, nurtured, implemented, and expanded to help St. Cloud become a national leader in providing innovative public services.

The Public Utilities Department includes drinking water treatment and distribution, wastewater conveyance and treatment, biofuel utilization, stormwater collection and treatment, nutrient recovery, and hydroelectric energy production. It casts a wide net and consists of 55 water quality and energy professionals.

"Co-digestion of high strength waste has a significant positive environmental impact. It takes waste that would typically harm the treatment process (through additional air demand for typical BNR treatment) and utilizes it as a fuel source. Local renewable energy is a huge step forward in sustainability."
Nicole Ringle,
Special Program Coordinator



The current organizational culture at St. Cloud Public Utilities was created by a group of professionals that have an enormous passion for the drinking water and wastewater industries, resource recovery and sustainable operations. Hiring practices are focused on identifying individuals with strengths that fit well with the existing team. Often, individuals that have an internal drive for success, high emotional intelligence, a strong work ethic and who will strive to make a difference

"Every day there is a new challenge. Some may not like that, I embrace it."
Jacob Ethen,
Industrial Electronics Technician

in what they do are given a place on the team. The driver behind all that the utility tackles and accomplishes is, and always will be, the people.

The leadership of St. Cloud Public Utilities is proud of the team that is developing and working together. Leadership recognizes the need for fulfillment and ownership in employees and has taken various steps towards ensuring a continuity of goals as well as services. Leadership training opportunities are provided to staff through third party and internal training programs; employees are encouraged and empowered to take leadership roles related to projects, programs, troubleshooting and optimization. Using the strengths of each team member has led to a culture of creativity and accountability regardless of job title. Innovation within the divisions continues to thrive and this has led to many successes by the St. Cloud Public Utilities team.

Collaboration of team members is consistent throughout. Project teams are developed for all large construction projects as well as smaller operational and maintenance projects. Complete transparency is provided to all team members throughout the projects, from planning to design through the construction period. This transparency and alliance has resulted in employee engagement in the process from project design to operation post construction. The St. Cloud Public Utilities team is exceptional at working together to optimize and improve operations following project completion. Excellence is achieved when everyone has pride in what they do and the ambition to get the job done.

RECENT PROJECTS OF REGIONAL AND NATIONAL SIGNIFICANCE

Biofuel Recovery, Utilization and High Strength Waste

This project was driven from the Resource Recovery and Energy Efficiency (R2E2) Master Planning that started in 2014. The foundation of this project included building and process improvements focused on immediate reductions in energy consumption. Upgrades included; HVAC controls, lighting, and optimization of existing operations processes; aeration, and UV disinfection for example. All together these accounted for an energy savings of 1.6 million kilowatt-hours (kWh's) annually. Jacob Ethen, Industrial Electronics Technician, recently commented that the project he is most proud of being a part of was the aeration optimization. Because of this project, aeration valves now operate on a 'Most Open Valve Control' strategy, significantly increasing blower efficiency and operational stability. The R2E2 related work continued with a Guaranteed Savings Project (GSP), which enabled the purchase of the facility's first biofuel generator. Methane gas produced during anaerobic digestion is the fuel for the engine, after the removal of hydrogen sulfide and siloxanes.

"Everyone working here is proud of what they do. We continue to share ideas with each other to keep improving. Working here feels like a small community of innovators wanting to seek more and overcome the next challenge that can arise, together as a team."
Rocio Durkot,
Laboratory Technician

The desire of staff to reach 'net zero,' generating all energy needed to power the NEW Recovery facility onsite, drove the now active High Strength Waste Program. Using pretreatment program knowledge, word of mouth, and multiple site visits and tours, the facility is now accepting products once sent for disposal as a waste product to increase methane production in the digesters to previously unseen levels. This enabled the purchase of a second biofuel generator, which is expected to be online by December 2019. These staff led efforts have been successful in generating over 80% of the energy demand onsite at the Nutrient, Energy and Water (NEW) Recovery Facility.

NUTRIENT RECOVERY AND REUSE (NR2)

The determination to go one step further with everything we do continued when reviewing options for the future of biosolids recycling in St. Cloud. The NEW Recovery Facility faced the common challenge of storage limitations for the well-established Class B Liquid Biosolids Program. Instead of expanding storage, drying or caking the product, the team looked for new and innovative technology options. Lystek Class A Biosolids technology enabled the continued use of liquid storage as well as utilizing the recent investments in hauling and injection equipment. The process uses high speed sheer mixing, steam and an alkali base in the Lystek reactor to produce a 15% total solids 'liquid'.

Ongoing production of liquid biosolids has enabled the program to continue to provide a highly valued agricultural product to local farmers.

In addition, the choice of a liquid product over a cake or dried product reduced the total capital costs for the NR2 Project by $12 million due to the ability to reuse existing buildings, infrastructure and recycling equipment.

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The digested solids are sent to a centrifuge before the solids portion reaches the Lystek reactor. The centrifuge and the Lystek process has led to a 70% volume reduction in product stored at the facility. The centrate, which is captured from the centrifuge, provided another opportunity for St. Cloud to be a leader.

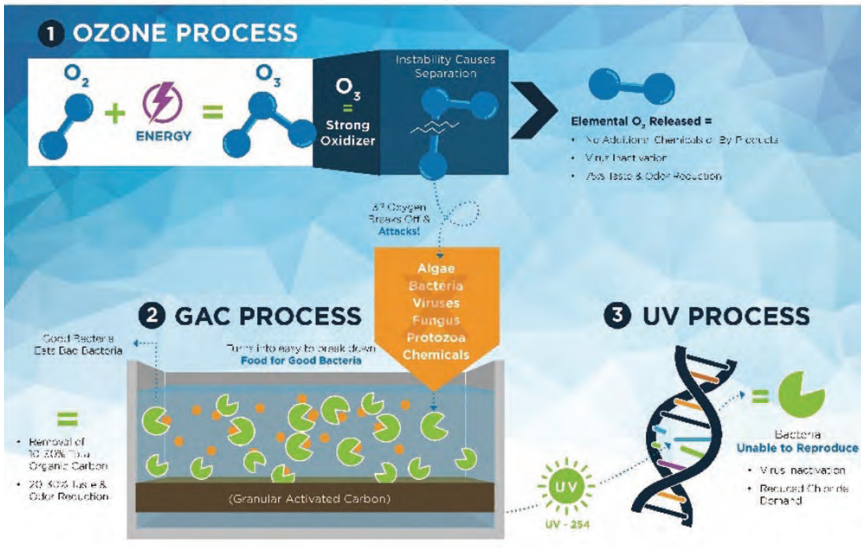
Ostara Nutrient Management Solutions is technology used to produce a pearl™ of magnesium ammonium phosphate. By removing nutrients, including dissolved phosphorous, from the return stream to the headworks, a lower-nutrient, higher quality effluent is returned to the Mississippi River. The centrate, already rich in phosphorus and ammonia, is captured and processed with added magnesium to produce the struvite pearl in a controlled environment. This fertilizer component is then shipped out for further processing. Recovering phosphorus improves water quality in the effluent and reduces the demand on the earth's finite phosphorus supply, which is mainly obtained through mining operations. Staff has openly embraced the new technologies and processes because they see the big picture and are excited for the future of the biosolids program. Creating a product that is environmentally friendly, sustainable and what local farmers want means something to our staff and gives a sense of achievement.

> "I love the concept of recovering wasted phosphorus, refining it and sending it to depleted regions. With the limited supply of minable phosphorus, the Ostara process has more than just environmental impacts."
> *Shanna Czeck, Environmental Compliance Specialist*

DRINKING WATER TREATMENT ADVANCED PROCESS AND IMPROVEMENTS

The Water Treatment Facility Advanced Process and Improvements project, currently in the design phase, is expected to break ground in 2020. The facility upgrades will include an Advanced Oxidation Process of ozone treatment and ultraviolet light disinfection. The conventional gravity flow filters will be upgraded to utilize biologically activated carbon. This project will enable increased taste and odor treatment as well as the reduction in disinfection by-product generation. The mentality of teamwork from design through construction continues and has only strengthened the project. As Jillian Pauls, Water Services Specialist, emphasized, "Our diverse avenues in life allow us to view and retain things differently, which permit all of the fine details to be covered and deliberated."

The team working on this project, and their combined expertise, will lead St. Cloud to "have advanced technologies, to be able to provide safe drinking water for future regulation limitations, and to be able to share our knowledge and facility with others, to help provide a safe solution." The St. Cloud Public Utilities department is continuously looking to the future and taking the necessary actions now that will provide for generations to come.



CITY WIDE WATER METER UPGRADES

St. Cloud residents have long been accustomed to waiting for a bimonthly bill to see their water use. This is changing because St. Cloud Public Utilities has committed to updating all residential water meters over a four-year window to an Advanced Metering Infrastructure (AMI) fixed network reading system. The new metering system will take hourly readings, which will be available to residents via the WaterSmart platform scheduled to go live in 2020. The platform will allow residents to set notifications for leak detection, monthly use, and billing projections. These valuable improvements will provide knowledge to residents, empowering them to make wise water use choices. The early leak detection system will facilitate early repairs and decreased water loss throughout the distribution system. These improvements are part of a customer-focused culture and provide customers with a high-quality service that will improve customer satisfaction and communication with the City.

SOUTH TOWER CONSTRUCTION

The city of St. Cloud is a growing community that is spread out over a distribution system area of 30 square miles. The southern part of St. Cloud is growing particularly fast – a new high school was constructed, and the industrial, commercial, and residential sectors have seen increased growth. The need to provide adequate storage, pressure regulation and fire suppression led to the construction of a 1.5 million-gallon water tower in 2016/17. The distribution system now consists of two ground storage tanks

> "A great example of science and technology coming together… extracting value from something that was once an environmental polluter and threat to public health… We're acting as a filter for the environment by being able to return water back to its source, only cleaner than when we collected it. It is inspiring to see department leadership be stewards of a resource, taking on the responsibility to improve its condition for those that follow us."
> *Matthew Erickson, Utility Service Operator*

and four towers that offer a combined capacity of 10 million gallons. Providing safe, reliable water to customers is of the utmost importance and a task that the staff does not take lightly. This project required collaboration across the divisions of Public Utilities and a commitment by all involved.

NORTH EAST REGIONAL TREATMENT SYSTEM

Stormwater treatment within the City has accelerated in the past 10 years, including the development of a 15-year implementation project for the reduction of solids discharged from an industrial area covering 367-acres in northeast St. Cloud. Since then, seven individual projects have been installed resulting in 33,120 pounds of solids being prevented from entering the Mississippi River annually. The Stormwater Division works alongside Public Works, Parks, Engineering, and Community Development (Planning) to ensure stormwater is included as a priority in Capital Improvement Projects. Grants totaling $1,361,000 have contributed to these projects that all involve collaboration with counties, watershed districts, and other stake holders.

"The best part of my job is the ownership I've been given over the things I do every day. Helping shape energy management and energy education has been a great experience for me."
Liz Kramer,
Public Services Analyst

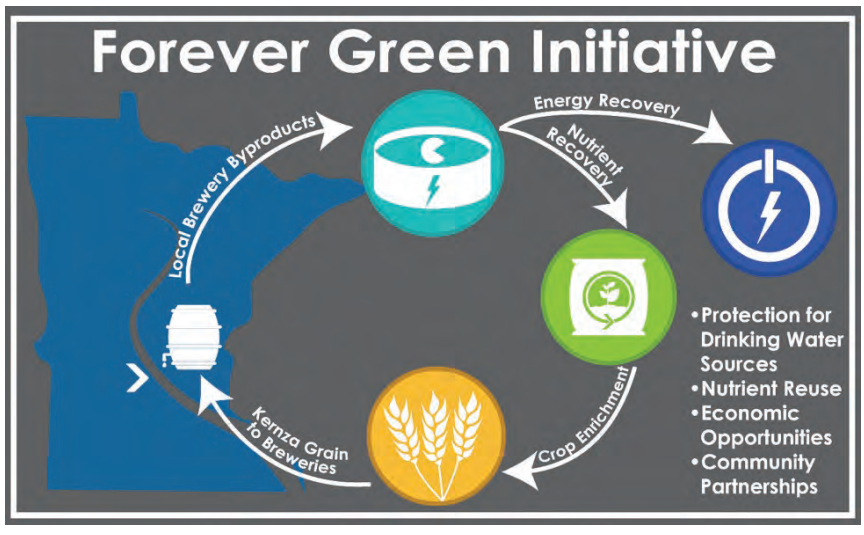
FOREVER GREEN INITIATIVE

The Public Utilities Department is working with the University of Minnesota, the Environment and Natural Resources Trust Fund, Stearns County Soil and Water Conservation District, the Upper Mississippi River Source Water Protection Program, the Clean Water Land and Legacy Amendment, and local businesses to facilitate a demonstration plot for the Forever Green Initiative. The Forever Green Initiative consists of a team of experts in the areas of genomics, breeding, agronomics and commercialization who are developing new crops and high efficiency cropping systems. In Fall 2019, the City planted ten acres of Kernza, a perennial grain with a deep root system, as part of a series of demonstration plots. The site selected is an MPCA approved biosolids land application site that has been receiving St. Cloud Biosolids for decades. The ancient grain's deep roots help with soil remediation efforts including decreasing soil erosion and preventing the release of nitrates into groundwater. The plants have year-round soil coverage, providing erosion protection throughout every season, something that is difficult to come by in Minnesota's climate. The Kernza grain planted in St. Cloud will be harvested and a local brewery has committed to create a custom, unique kernza beer. The brewery in this partnership is one of the businesses that utilize the St. Cloud High Strength Waste Program for disposal of their waste yeast and hops. The Forever Green Initiative, as well as the St. Cloud Kernza demonstration site, is aimed at creating a sustainable cycle of growth that will help provide clean water and renewable resources in the area. St. Cloud Public Utilities is proud and excited to be a part of such a synergistic research group.

HYDRO TRIP GATE REPLACEMENT

St. Cloud Public Utilities installed an Obermeyer spillway gate system at the St. Cloud Dam and Hydroelectric Facility. The system has a row of steel gate panels supported by inflatable air bladders. The elevation of the reservoir is adjusted and maintained by controlling the air pressure in the bladders. Obermeyer gates can be set at many positions between fully raised and fully lowered. The gates use no high-precision parts or bearings, enhancing the service life and requiring minimal maintenance. These gates result in reduced fluctuations in Mississippi River levels – increasing opportunities for recreational use and improving conditions for nearby fish populations.

NE Stormwater Project 2019: Large box culverts are put together under the road to create a buried stormwater pond. The culverts have strategic baffles to catch floating debris and allow sediment to settle. The system is accessed through manholes in the roadway.



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The gates also enable increased and consistent energy production, reduced gate icing, and improved safety conditions for staff. Completion of this project further promoted the City's dedication to renewable energy while protecting staff safety and the natural resources that are vital to our community.

RENEWABLE ENERGY

The City of St. Cloud began developing their Renewable Energy Efficiency Initiative (REEI) in 2014. The REEI was initiated to meet St. Cloud's energy and sustainability goals. Since work on the Renewable Energy Efficiency Initiative began, St. Cloud has completed several energy efficiency projects; solar arrays have been constructed on City property and the City subscribes to over 30 community solar gardens. Currently, 62% of the City's electrical energy demand required to provide city services is generated from renewable energy sources. St. Cloud has become a national leader in innovative, cost-effective and sustainable practices. Every division in St. Cloud's Public Services Department has played a part in accomplishing the renewable energy goals.

11 city facilities host onsite solar arrays, including two arrays at the Wastewater Treatment Facility and one at the Drinking Water Treatment Facility. The annual production capacity of the arrays will total nearly two million kilowatt-hours (kWh's) of energy. The biofuel generator at the NEW Recovery Facility generates over four million kWh's of renewable energy each year. The solar and biofuel projects at this facility combined with energy efficiency work have helped the facility achieve many 'net-zero' days, when all the energy required to run the treatment facility for that day is produced onsite. On some days the facility even exports surplus renewable energy back to the electric grid. A second biofuel generator will be online and generating renewable energy at the NEW Recovery Facility in 2019.

"I chose to apply for this position because I have always wanted to work for a place that contributed in a positive way to the community."
Natalie Bartell, Laboratory Assistant

In addition to producing renewable energy, the Public Utilities Department has worked with other departments across the City to ensure that every building, lighting system, and piece of equipment in the City is helping utilize renewable energy. Every eligible electrical account is subscribed

to community solar gardens, which are subscription based renewable energy credit programs. The credits help facilitate the use of renewable energy while saving money for rate and tax payers. Energy efficiency efforts have also reduced costs across the city of St. Cloud and provided additional value to the services provided to residents. Efficiency efforts have saved over 1.6 million kWh's a year at the Nutrient, Energy & Water Recovery Facility alone, and a combined four million kWh's annually across the City.

COMMUNITY INVOLVEMENT

St. Cloud has encouraged sustainability actions for residents and rate payers, as well as City departments and divisions. The St. Cloud community has been involved in City energy decisions and residents are encouraged to make educated energy decisions for themselves through educational programs and a community energy action plan. These community efforts allow renewable energy and energy efficiency efforts to expand beyond the scope of what the City can directly control. The Public Utilities Department has encouraged this through facilitating the St. Cloud's Partners in Energy program in partnership with the electric supplier, establishing energy goals, and subsequent action plans.

> "Interacting with the public, especially when I'm out televising… I like showing them one of the things we do to maintain the 'invisible' parts of the City."
> *Amanda Hoeschen,*
> *Utility Service Operator*

Tours and Open Houses at the NEW Recovery Facility and the Water Treatment Facility are available and encouraged for all age groups. Staff have seen the results of these efforts.

"The largest beneficial environmental impact is our energy savings projects," says Rocio Durkot, Laboratory Technician, "reducing the carbon foot print, lowering greenhouse gas emissions, and being sustainable. I think if the community sees that a municipal utility department, a large energy consumer in the City, can cut back – they can too."

CAPACITY, MANAGEMENT, OPERATIONS AND MAINTENANCE (CMOM)

The Infrastructure Services staff undertook the mission of master planning for the collection system in 2011. Strategic planning led to setting the goals of televising and inspecting 20% of the system a year and implementing a five-year inspection cycle. The dedication of staff to ensure televising and inspection quality, which can identify potential and sometimes vital maintenance, has given a true picture of the infrastructure integrity. These inspections are an important part of maintaining the infrastructure because it provides indicators that show how a main is functioning or if there are concerns. It also helps conserve resources by directing efforts to the areas of the collection system that are most in need of

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maintenance, rather than providing redundant cleaning to areas that are in good shape and potentially missing areas that need more urgent attention. This has become a favorite job task for some team members, who enjoy getting to communicate the importance of maintenance to residents. Visibility is a common problem that is faced when trying to communicate with community members regarding the need for infrastructure replacement. St. Cloud Public Utilities staff embrace the challenge and use their visibility in the public eye to promote the services that they provide and the resources that are needed.

"The best part about my job is seeing so many people within the City working together to accomplish a common goal of protecting our water resources. As someone who is new to this career field, I find it immensely inspiring to see the hard work and dedication of our employees."
Chyann Erickson, Environmental Compliance Assistant

THE FUTURE IS BRIGHT

The Utility has taken the initiative to take part in external optimization and accountability programs such as the Partnership for Safe Water, Partnership for Clean Water, and the National Biosolids Partnership Environmental Manager System. The team approach to management has continued throughout these programs as well and all have been led by specialist level staff, allowing a team with autonomy, ownership, leadership experience, buy in and synergy to flourish. As well as these optimization programs, the Utility has been recognized as a Utility of the Future Today three years in a row by the National Association of Clean Water Agencies (NACWA), the Water Environment Federation (WEF), and the Water Environment Research Foundation (WERF). With a team committed to being GREATER, the future in St. Cloud is bright and full of innovation, improvement and excellence. CS

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25TH ANNUAL CSWEA
EDUCATION SEMINAR

Learning from Leaders, Education Seminar 25th Anniversary

8:00 am-8:10 am	Welcome and Introductions
8:10 am-8:40 am	From Treatment to Resource | Dr. Bruce Rittman, ASU
8:40 am-9:15 am	Enabling Innovation on the Nutrient Management Journey | Cindy Wallis-Lage
9:20 am-9:45 am	LIFT and Student Poster Session & Break
9:45 am-10:20 am	Achieving Resource Efficiency in Urban Water Systems and the Role of Hybrid Solutions | Dr. Nancy Love
10:20 am-10:55 am	Biomimicry: A Force for Sustaining Utilities into the Future | Dr. Art Umble
10:55 am-11:15 am	Globalization of Sanitation | Mohammed Haque
11:15 am-11:45 am	Morning Panel Q&A
11:45 am-1: 00 pm	Lunch with LIFT and Student Poster Session
1:00 pm-1:35 pm	Prying Open the Black Box | Dr. Bruce Rittman
1:35 pm-2:10 pm	Innovation Highlights from WLSSD's 40 Year History | Carrie Clement
2:10 pm-2:30 pm	Break
2:30 pm-3:05 pm	From Rags to Resources: The Movement Towards Resource Recovery at MWRD Chicago | Tom Kunetz
3:05 pm-3:40 pm	Research to Reality: The Madison MSD Legacy | Steven Reusser
3:40 pm-4:00 pm	Afternoon Panel Q&A

APRIL 7 2020

MONONA TERRACE CONVENTION CENTER, MADISON, WISCONSIN

April 7, 2020 • Madison Wisconsin

Mark your calendars and budget for the CSWEA 25th Annual Education Seminar to be held on April 7, 2020 at Monona Terrace in Madison, WI. We have an exciting program focused on what we can learn from key leaders in the industry.

This is an excellent, affordable event to learn about issues and technical advances from national and local experts. In addition, attendees will earn approximately seven (7) professional development hours (PDHs) for professional engineers and operator's license requirements.

8:00-8:10 am: Welcome Remarks

8:10-8:40 am: From Treatment to Resource

Dr. Bruce E. Rittman
Director of Biodesign Swette Center for Environmental Biotechnology at Arizona State University

While wastewater treatment has focused on removing water pollutants, many of the pollutants are valuable resources if recovered in a useful form. This presentation focuses on novel means to capture the energy value in 'used waters', including domestic wastewater. New developments in anaerobic membrane biofilm reactors (to generate methane) and microbial electrochemical cells (to generate electrical power or hydrogen gas) now make it feasible to achieve energy-positive treatment of the BOD. After recovery of the energy from used water, most of the N and P are released as inorganic forms that can be recovered for recycle to agriculture. This talk will focus on P recovery, although many of the principles also apply for N. An important take-home lesson is that traditional techniques for 'P removal' will not work for P recovery. P-recovery techniques that produce a product useful in agriculture include precipitation as struvite or hydroxyapatite and selective sorption to Fe-based sorbents. This talk will introduce the new technologies and offer insights into their pros and cons.

LODGING

A limited number of rooms are available at the Hilton Madison Monona Terrace Hotel, 1 West Dayton Street, Madison. The rooms have been reserved at a conference rate of $149 per night (plus tax) and will be held until March 6, 2020. For reservations, please call 877-510-7465 and use group code *CSWEA*. Indicate your affiliation with CSWEA Education Seminar. Parking is available at a fee. Other lodging is available nearby at the Best Western Premier Park Hotel (608-285-8000) at a rate of $144 to $194. A reserve block is available until March 9, 2020. This hotel is about 0.7 miles walking distance from the Monona Terrace Community and Convention Center.

Dr. Bruce E. Rittmann is Regents' Professor of Environmental Engineering and Director of the Biodesign Swette Center for Environmental Biotechnology at Arizona State University. His research focuses on the science and engineering needed to "manage microbial communities to provide services to society." Services include generating renewable energy, cleaning water and soil, and improving human health. Dr. Rittmann is a member of the National Academy of Engineering; a Fellow of AAAS, WEF, IWA, and NAI; and a Distinguished Member of ASCE. Dr. Rittmann was awarded the first Clarke Prize for Outstanding Achievements in Water Science and Technology from the NWRI, the Walter Huber Research Prize and the Simon Freese Award from ASCE, the G.M. Fair Award from AAEES, and the Perry L. McCarty/AEESP Founders Award. He is the co-winner of the 2018 Stockholm Water Prize. Dr. Rittmann has published over 670 journal articles, books, and book chapters, and he has 16 patents. With Dr. Perry McCarty, Dr. Rittmann co-authored the textbook *Environmental Biotechnology: Principles and Applications* (McGraw-Hill Book Co.).

8:40-9:15 am: Enabling Innovation on the Nutrient Management Journey

Cindy Wallis-Lage
Executive Director, President, Water Business at Black & Veatch

Nutrient management was one of the grand challenges presented by the National Academy of Engineering for the 21st century, and the topic is a key aspect of our sustainable future. As part of the Planetary Boundaries concept developed by the Stockholm Resilience Center (2009), key researchers identified the biochemical flows of nitrogen and phosphorus as one of the most critical processes that regulate the stability and resilience of the Earth system. Finding innovative ways to address nutrient management from wastewater streams is a key component for the future of global nutrient management. Innovative approaches will involve new technological solutions for nutrient removal and recovery, but also innovative approaches and partnerships between different stakeholders. This presentation will provide a background on the journey towards nutrient removal by our industry, and discuss emerging technologies, approaches, and partnerships that will drive the future of nutrient management.

Cindy Wallis-Lage is President of Black & Veatch's Water Business and a member of the company's Executive Committee and Board of Directors. As President, Wallis-Lage is responsible for Black & Veatch's water-related business strategies, development and operations. She leads a workforce of nearly 3,000 professionals. A licensed professional engineer who joined Black & Veatch in 1986, Wallis-Lage has been involved in more than 100 projects around the world in both the municipal and industrial sectors. Wallis-Lage

became recognized as a foremost expert on the treatment and reuse of water and wastewater resources. She is also a champion for communicating water's true value and its impact on building sustainable, resilient communities. Wallis-Lage is also a dynamic leader of industry- and community-based organizations and programs. She currently serves on the Board of Directors for both the US Water Alliance and the Water Research Foundation. She also serves on the Leadership Council for Water For People.

9:15-9:45 am: LIFT and Student Poster Session & Break

9:45-10:20 am: Achieving Resource Efficiency in Urban Water Systems and the Role of Hybrid Solutions

Dr. Nancy Love, Ph.D., P.E., BCEE
Borchardt and Glysson Collegiate Professor, University of Michigan

America's communities depend on public sector infrastructure for drinking water supply, sanitary sewage and stormwater management, transportation, food distribution, and electricity generation and distribution. The control of this infrastructure is largely centralized, where resources serving large segments of a community's population flow in and out of a single hub. Today, these systems provide most of society with an unmatched quality of service, but are increasingly causing resource inefficiencies. Achieving resource efficiency in communities lies with creating innovative, cyber-enabled solutions that shift the focus for infrastructure from a 'one size fits all'-service-oriented approach to a resource management-oriented approach. This will create a new generation of infrastructure solutions, which comes just as much of the 20th century public-sector infrastructure is reaching the end of its design life. This talk will address resource efficiency as it pertains to nitrogen and phosphorus flows through the food-water-nutrient cycle, and the role that source separation of yellow, gray and black water at the building scale, and either localized or centralized processing for reuse can play to achieve efficient resource management.

Dr. Nancy G. Love is the Borchardt and Glysson Collegiate Professor of Civil and Environmental Engineering at the University Michigan, and an adjunct Professor at the Institute of Biotechnology at Addis Ababa University. She has advised over 70 graduate students and post-doctoral research associates. Her research focuses at the interface of water, infrastructure and both environmental & public health. She and her students evaluate the fate, detection and treatment of chemical and biological contaminants in water systems, and advance technologies to establish the efficient management of nutrients, energy and water resources. Their work is centered on identifying and translating fundamental understanding into practical solutions for water utilities and communities. She has co-authored: over 100 peer reviewed papers, chapters and reports; over 250 conference presentations; and a textbook on biological wastewater treatment.
Dr. Love has held leadership positions in multiple organizations, including with the Water Environment Federation (WEF), the International Water Association (IWA), and the Association of Environmental Engineering and Science Professors (AEESP), and is a Fellow of all three organizations. Dr. Love is a licensed professional engineer (P.E.) in the state of Michigan and a Board Certified Environmental Engineer (BCEE).

10:20-10:55 am: Biomimicry: A Force for Sustaining Utilities into the Future

Dr. Art Umble
Senior Vice President, Global Wastewater Practice Leader

The circular economy poses a great opportunity because its primary focus is on recovering resources from waste streams and converting them into economic value.

But for circular economy to become commonplace, it must mimic nature. Local municipal wastewater treatment facilities are poised for circular economy initiatives because of its relationship to natural systems. The utility of the future, however, must expand well beyond mechanical systems and utilize natural systems for recovery of energy, nutrients, carbon, metals and water. Such natural systems include microalgae and polyhydroxyalkanate-accumulating organisms for production of biofuels and bioplastics, microbial electrochemical systems that produce power, recovering rare earth elements and even decentralization of our treatment networks, with treatment wetlands constructed vertically and horizontally, in brownfields, on sides of buildings, in parks, in street medians, etc., that also couples with food production. Can we envision how by aggregating multiple local-scale circular economies connects us to the macro-scale challenges so that our contribution is meaningful?

Dr. Umble received his B.S. in Civil Engineering from Kansas State University and his Ph.D. in Civil Engineering from the University of Notre Dame. Dr. Umble currently leads the Global Wastewater Practice for Stantec Consulting, focusing on municipal and industrial wastewater treatment technologies, with an emphasis on converting waste streams to value streams and is a national leader in initiatives involving environmentally sustainable systems. He provides technical support to design teams for new and rehabilitated wastewater treatment plants, focusing on nutrient removal and recovery facilities, process optimization and energy management. He serves in numerous state and national forums and stakeholder work groups related to emerging treatment technologies, sustainability in treatment and environmental regulation. In addition to consulting, Dr. Umble's experience also includes university teaching and managing a publicly owned water and wastewater utility.

10:55-11:15 am: Globalization of Sanitation

Mohammed Haque
Executive Director, Global Water Stewardship and CSWEA

Sustainable Development Goal #6 indicates that as of 2015, 61% of the world's population lack access to basic sanitation (4.75 billion people). The sheer size of the issue, has seen the Gates Foundation and other philanthropic efforts spend in excess of $200 million to develop decentralized systems like composting toilets. The investment in helping 4.75 billion people is expected to be a $10 trillion market and is predicted to save half a million lives. The sheer scale is tremendous. The presentation will explore the market, size, and the approach that Global Water Stewardship has taken to work with developing countries like Costa Rica on education and outreach to develop and nurture a centralized wastewater treatment market. The presentation will explore how this model will trickle down to other environmentally conscious developing countries and how the SD6 goals are actually understated from an environmental and education perspective.

Mohammed M. Haque is the District Manager for the Northern Moraine WRD in Island Lake, Illinois. He has been the Executive Director of the Central States Water Environment Association since 2012 and founded Global Water Stewardship (GWS), a service-based volunteer organization that has been a catalyst for the establishment and growth of a wastewater industry in Costa Rica. He has an MBA from the University of Notre Dame and B.S. in Civil Engineering and Environmental Engineering from the University of Wisconsin – Platteville. Mohammed is a firm believer in the amazing potential our industry has to clean water and recover resources throughout the world.

11:15-11:45 am: Morning Panel Q&A

11:45 am-1:00 pm: Lunch with LIFT and Student Poster Session

1:00-1:35 pm: Prying Open the Black Box

Dr. Bruce E. Rittman
Director of Biodesign Swette Center for Environmental Biotechnology at Arizona State University

The lecture tells the story of how the field we now call Environmental Biotechnology was created by the marriage of environmental engineering and molecular microbial ecology. It traces the roots from the day David Stahl knocked on my office door to introduce me to rRNA hybridization to today's status of Environmental Biotechnology being a leading-edge topic for research and practice to develop a range of novel processes, such as anammox, the membrane biofilm reactor, and microbial electrochemical cells. The talk introduces the science advances, the new technologies, and the key people behind them.

1:35-2:10 pm: Innovation Highlights from WLSSD's 40 Year History

Carrie Clement
WLSSD Manager of Planning and Technical Services

Safety, Reliability and Efficiency have driven innovation at the Western Lake Superior Sanitary District (WLSSD) during its 40 years of operations. WLSSD is a regional wastewater and solid waste authority in Northeastern Minnesota who operates a 40 MGD high purity oxygen activated sludge wastewater treatment process with unique influent characteristics which presents challenges and opportunities for innovation.

Carrie Clement earned a B.S. degree in Civil Engineering (BSCE) from the University of Minnesota. She is licensed as a Professional Engineer in the State of Minnesota and holds a Minnesota Class A Wastewater Operator license. Carrie Clement oversees a broad range of functions including WLSSD's capital budget and projects planning, solid waste operations, environmental compliance, engineering and planning functions to ensure the district provides the region with the wastewater and solid waste services needed today and into the future. With WLSSD since 2000, Clement ensures the integrity and long term reliability of WLSSD's wastewater and solid waste infrastructure. Through integration of state-of-the-art technologies, exceptional planning and management of WLSSD's capital improvement program, management of the interceptor inspection and maintenance program, and ongoing project management and technical support, Carrie and her team support facility operations to ensure the reliability, effectiveness and longevity of WLSSD's facilities and infrastructure.

2:10-2:30 pm: Break

2:30-3:05 pm: From Rags to Resources: The Movement Towards Resource Recovery at MWRD Chicago

Tom Kunetz, P.E.
Assistant Director of Monitoring and Research for Chicago MWRD

By definition, 'waste' is material that has no perceived value. But as soon as value is assigned to that material, it is no longer a 'waste' but a 'resource'. The Metropolitan Water Reclamation District of Greater Chicago (MWRD) has a strategic goal to seek opportunities to recover resources, return materials to the economy, and where possible, earn revenues from those recovered resources. This presentation will present activities the MWRD is pursuing to turn wastes into resources, such as the largest struvite nutrient recovery facility in the world, as well as the drivers, challenges, and lessons learned on the path toward resource recovery.

Tom Kunetz earned his B.S. in environmental engineering from the Pennsylvania State University and an M.S. in water resources engineering from Villanova University. Tom is the assistant director of monitoring and research for the Metropolitan Water Reclamation District of Greater Chicago. He has more than 30 years of experience in the field of environmental engineering in both the public and private sectors, focusing on design of wastewater treatment facilities. Tom is a registered professional engineer in the state of Illinois. He is a graduate of the WEF-sponsored Water and Wastewater Leadership Center at the University of North Carolina, the 2012 recipient of the Charles Walter Nichols Award for Environmental Excellence from the American Public Works Association and a WEF Fellow. Tom is the immediate past president of the WEF.

3:05-3:40 pm: Research to Reality: The Madison MSD Legacy

Steven R. Reusser, PE, Certified Operator Adjunct Professor in the Department of Civil and Environmental Engineering

The focus of wastewater treatment innovation over the last 25 + years has been on nutrient removal and energy efficiency. Technology has capitalized on amazing bacterial adaptability, and the resulting process developments have been rapid and continuous. The Madison Metropolitan Sewerage District has participated in the innovation explosion since the 1970s. In-house research has been combined with annually funding two or more UW-Madison graduate students per year doing applied research. Research findings have been incorporated into many design ideas, including into several major additions between 1992 and 2016. The MMSD research during this period emphasized biological phosphorus removal, phosphorus recovery, anaerobic digestion options, and energy conservation. The energy conservation investigations included continued fine bubble diffuser research, low D.O. operation, and co-digestion of whey for increased electrical generation. The District is currently continuing this legacy of research in many areas. A discussion of some of the findings, implemented ideas, and research payback will be included in the presentation.

Steven R. Reusser is an Adjunct Professor in the Department of Civil and Environmental Engineering (CEE), University of Wisconsin – Madison. He retired in 2016, from a 35-year career as Operations Engineer at the Madison Metropolitan Sewerage District (MMSD), Madison, WI. With MMSD, Steve was responsible for plant operations, process control programming, and operator supervision and contributed significantly to many research and engineering projects. Most of the research projects involved mentoring University of Wisconsin students, funded through a MMSD-UW-Madison cooperation agreement, for process investigations at the plant. Steve is currently working as a Senior Process Engineer with Ayres Associates at Eau Claire, WI. Steve received a BS degree in Civil Engineering, and an MS in Bioenvironmental Engineering from Oklahoma State University. Prior to his work at MMSD Steve worked for the Indian Public Health Service in South Dakota, and for McGhie and Betts Consulting Engineers in Rochester, Minnesota.

3:40-4:00 pm: Afternoon Panel Q&A CS

THE 34TH ANNUAL CONFERENCE ON THE ENVIRONMENT RECAP

On November 7, 2019 the Minnesota Section of CSWEA co-hosted the 34th Annual Conference on the Environment (COE). Like past COE's, the event was co-hosted with the Upper Midwest Section of the Air & Waste Management Association (AWMA).

The one-day conference was a hit with over 360 attendees, 16 exhibitors, and 8 conference sponsors. A stellar technical program helped draw the large crowd, living up to the COE's reputation as a place to go for regulatory updates and timely and informative technical presentations.

The keynote address was given by Ms. Laura Bishop, the commissioner of the Minnesota Pollution Control Agency (MPCA). Commissioner Bishop's presentation focused on the collaborative approach the MPCA is taking on a variety of environmental issues including solid waste management and air and water quality regulations. Starting the day with a broad overview of environmental topics fits the diverse audience well. We were thankful to have the Commissioner present and share new approaches that the MPCA is taking to address large-scale environmental issues in the state. One interesting topic from her presentation was about the proposed Clean Cars Minnesota initiative that would encourage automakers to sell more models of low- and zero-emission vehicles in Minnesota than are currently available. See *www.pca.state.mn.us/air/clean-cars-mn-why#* for more information.

This year's technical sessions on the water side of the program covered a variety of topics. There were several very good presentations about PFAS regulations and treatment systems. There were sessions covering stormwater, emerging contaminants, resource recovery and energy, and general wastewater topics. There were two presentations that dealt with implementing a project quickly following fires, which offered a unique look at how to deal with emergency response scenarios. There was a strong regulatory update track, including a presentation from the WEF Government Affairs Committee Chair. Thank you to all the speakers who shared such great information and stories and to the moderators who helped facilitates the sessions.

It is also important to recognize the contributions made by college and university students at the COE. Over 50 students registered for the COE, either to present posters about their research work, or to participate in the 12th Annual Student Environmental Challenge. Eight teams representing North Dakota State University, the University of Minnesota, the University of Minnesota-Duluth, and the University of St. Thomas participated in this year's Student Environmental Challenge. The problem focused on chloride reduction at a municipal wastewater treatment plant. This is a timely topic in Minnesota, as there are many cities that will be facing similar challenges related to chlorides and other salty parameters. Winning first place for the Challenge was the team from North Dakota State University , which consisted of Arianna Christian, Mara Roteliuk, Troy Borud, and Dustin Grandbois. In second place was St. Thomas Team 1, which consisted of Matt Reinke, Emma Matthes, Maddi Frisk, and Paul Youngblood. In third place was St. Thomas Team 3, which consisted of Sarah Shadle, Isabella Granse, Geena Stepp, and Sarah Howe. Thank you to all the students that participated, and the judges and facilitators of the event.

A special thanks to everyone who helped make the day such a successful event, especially the conference planning committee. Also, a huge thanks to all the exhibitors and sponsors. Finally, a thank you to everyone who attended – we hope you come again next year. And if you would like to get involved with planning, please reach out to someone actively involved in the Minnesota Section. CS

1ST PLACE – North Dakota State University, Arianna Christian, Mara Roteliuk, Troy Borud, and Dustin Grandbois.

2ND PLACE – St. Thomas, Team 1

3RD PLACE – St. Thomas, Team 3

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CSWEA WEFTEC '19 RECAP

2019 WEFTEC STUDENT DESIGN COMPETITION

Central States was once again well represented at the WEF Student Design Competition at WEFTEC 2019 in Chicago, IL.

CSWEA developed their student design competition criteria based on WEF guidelines and student chapters were notified of the competition during the fall semester of the 2018-19 school year. The Student Design Competition is intended to promote 'real world and hands on' design experience for student interested in pursuing an education and/or career in water/wastewater engineering and STEM fields. There are two levels of the WEF competition, conventional wastewater design, which includes traditional wastewater design projects, and environmental design, which includes contemporary engineering design topics such as sustainability, water reuse, wetland construction and Engineers Without Borders projects. However, CSWEA also holds a third category for the Global Water Stewardship (GWS) project.

CSWEA had a total of four entries in the 2019 Student Design Competition which was held the day before the Education Seminar in Madison last April. There was one entry in the Environmental design competition from the University of Illinois – Urbana/Champaign with Javier Mulero, Alana Rosenbaum, Alexa Yeo, Jinglin Duan presenting their project titled "Solutions for Houston Flooding".

There were three entries in the GWS category on "Global Water Stewardship – Monteverde, Costa Rica", two from the University of Wisconsin - Platteville and one from the Milwaukee School of Engineering. All teams did great, but in the end the team consisting of Guissel Divila, Christine Boland-Prom, Jamie Sykora, Sydney Shaffer, Miranda Durbin, Rachelle Montavon and Alexis Countryman from MSOE were found to be the winner. All seven of the members from the MSOE team accompanied CSWEA members and GWS volunteers to Costa Rica over the summer to assist with site investigations for next year's problem statement.

The UIUC and MSOE winning teams presented their projects at the WEF competition held during WEFTEC where they faced stiff competition from a record number of 29 student teams from throughout the US, Canada, and Singapore. Both teams did an amazing job and the team from MSOE stood out amongst their peers and took 4th place and were only two points short of placing in the top two teams. Both teams did a great job and should be very proud of their accomplishments, as we should all be proud of having had them represent CSWEA. CS

OPERATIONS CHALLENGE 2019, ANOTHER WINNING YEAR

By Kathy Crowson

Year after year, it never ceases to amaze me how CSWEA produces high performing Operations Challenge Teams to compete at WEFTEC. This year was no exception.

CSWEA, like all member associations of WEF, can send two teams to compete in the Operations Challenge. While most associations send teams that represent a specific wastewater treatment plant, CSWEA forms teams of professional operators from each of the member states (Illinois, Minnesota and Wisconsin). That's right – two teams each made up of professional operators who do not work together, or even necessarily work in the same state!

So how are these teams formed? Each state section of CSWEA, recognizes an Operator of the Year for facility operations and collection system operations. It's these professional operators that form the foundation of the two operations challenge teams. (Next year, be sure to nominate deserving operators to represent your state at the Operations Challenge!)

This year's teams included the following professionals:

CSWEA Pumpers		
Marc Zimmerman, Coach	Janesville Wastewater Utility	WI
Joe Watson, Captain	New Water	WI
Aaron Berry	Trotter Associates	IL
Brian Schoenecker	City of St. Cloud Public Works	MN
Mark Knuth	Racine Wastewater Treatment Plant	WI





CSWEA Shovelers		
Chris Lefebvre, Coach	Stevens Point Public Utilities	WI
Brent Perz	Baxter & Woodman	IL
Brandon Stall	Western Lake Superior Sanitary District	MN
Jason Robbins	Kishwaukee Water Reclamation District	IL
Wade Lagle	Urbana & Champaign Sanitary District	IL

So how did we do? Our teams represented us in true CSWEA form!

The Shovelers took 1st place in the Process Control event, scoring 100% on the test that covers various calculations, process control scenarios, and running a Hydromatis model.

The Pumpers took 4th place in the Laboratory event, which requires precision and team work at the highest level.

Congratulations to all the team members, new and returning. A sincere thank you to all the sponsors who financially support the teams.

On a final note, a special thanks to the Janesville WWTP for providing a venue and the staff support that allows our professional operators a place for the team building and the preparation that leads to CSWEA sending winning teams to the WEFTEC Operations Challenge, year after year. CS

Aqua-Aerobics Headquarters in Loves Park, IL

LIFT Spotlight:

Aqua-Aerobic Systems, Inc.

The Rock River Water Reclamation District (RRWRD) and Aqua-Aerobic Systems, Inc.* (Aqua) have a unique and mutually productive relationship that optimizes the development of innovative wastewater treatment technologies in the Rockford, IL region.

RRWRD is the regional water reclamation authority in the Rockford, IL area, serving nearly 100 square miles of Winnebago County. It serves around 240,000 people in the communities of Rockford, Loves Park, Machesney Park, Roscoe, Cherry Valley, New Milford, Winnebago, and a small portion of Rockton. Except for several private collection systems, the District owns and maintains all sanitary sewerage collection facilities within its boundaries. The District's approximately 1,100-mile long network of buried sewers conveys wastewater from industrial sites,

The INNOVATION & TECHNOLOGY COMMITTEE will regularly solicit articles for publication in the *Central States Water* magazine regarding new water technologies and innovation in the water field and will help promote CSWEA Leaders Innovation Forum for Technology (LIFT) engagement. This first article focuses on an innovative activated sludge process, a granular sludge process, which allows for multiple process benefits to be realized. This is one of the innovative technologies in LIFT Link. LIFT Link was developed by the Water Research Foundation (WRF), then known as the Water Environment Research Foundation. LIFT Link is part of the WRF/WEF LIFT (*www.werf.org/lift*) program to accelerate innovation into practice. LIFT Link is an online platform which serves as a conduit of interaction among municipal and industrial water, wastewater, and stormwater agencies, technology providers, consultants, academics, investors, federal agencies, and others for advancing innovation. LIFT Link allows its users to discover new technologies and research needs; connect with others with similar needs, technology interests, and desired expertise; and collaborate on research and technology ideas, proposals, projects, demonstrations, and implementation. If interested in accessing LIFT and gaining a login please reach out to Mohammed Haque at *mhaque@cswea.org*.

AquaNereda Working Process Facility on RRWRD Plant Site

other businesses, and residences to the treatment plant in southeast Rockford.

The RRWRD treatment plant is a 40 MGD secondary treatment facility, consisting of screening, pumping, grit removal, primary clarification, nitrifying activated sludge, chlorine disinfection with de-chlorination, gravity and gravity belt sludge thickening, anaerobic digestion, centrifuge sludge dewatering, and methane gas recovery used to drive a combined heat and power plant. Plant effluent is discharged into the Rock River in Southeast Rockford.

Aqua is located in the RRWRD service area in Loves Park, IL. Well-known since 1969 for the manufacture of aeration equipment, the company has expanded and now provides total water management solutions in aeration and mixing, biological processes, filtration, membranes, oxidation/disinfection and process control, as well as aftermarket products and services, employing approximately 150 people in research and development, engineering, sales/marketing, manufacturing, customer service and administration.

The strategic partnership evolved from the long-time relationship that naturally occurs with the proximity of two prominent entities in the wastewater industry. When Aqua was searching for a test-bed site where a consistent supply of various wastewater streams would be available, RRWRD was willing to provide the access and space needed to support this significant regional employer. In June 2011, RRWRD agreed to allow Aqua to build a research and development facility on RRWRD's treatment plant site and to use the District's wastewater flow in its research and product development.

Aqua has made excellent use of the facility. Technologies that have been tested on-site include cloth filter media, primary filtration, MegaDisk, IntelliPro Filter Control System, and most recently the AquaNereda Process. On-site testing supports equipment development via lifecycle testing, durability testing, mechanical resistance, and system reliability, allowing rapid proto-typing and accelerated product development and time to market. In addition, customer requirements are met by using the facility for factory visits, system inspections, wet testing, contractual compliance, and product validation.

In 2016, Aqua was seeking to build a working or 'live' AquaNereda process facility. Based upon Aqua and RRWRD's ongoing relationship, Aqua chose the District as the site of its AquaNereda process facility and entered into an agreement in August of 2016 to site the facility at RRWRD. The agreement grants exclusive use of a portion of RRWRD property for the construction of the facility. While all of Aqua's data and research is proprietary to Aqua, RRWRD is allowed to access the data and research for use in its future development plans and process operating strategy.

AquaNereda Development

Aqua is bringing this aerobic granular sludge (AGS) process to the American market. The technology has been under development in the Netherlands over the past twenty years, and been in full-scale use in Europe since 2010, providing numerous advantages to a growing number of facilities there and around the world.

The value proposition for AGS technology is that it delivers high-level BNR within an exceptionally small volume using common microorganisms that are densely arranged by applying specific process conditions that permit rapid solids/liquid separation. Unlike other biologically intensive process configurations, AGS is able to facilitate TN, TP and total suspended solids (TSS) removals without membranes, carrier structures or external ballast. Further, the high unit biomass can be supported without an aeration power-penalty via the unique granular structure which concentrates a diverse microbial biome into a densely packed, roughly-spherical biological form ranging from about 0.2 mm to more than 5mm in diameter. Using natural processes to agglomerate microbes results in a lower biological solids presence in the bulk liquid as 80 to 90% or more of the system's biomass can be managed in the granule. As a result, highly effective mixed liquor suspended solids (MLSS) values can be maintained permitting three to four times the biomass compared to conventional activated sludge (CAS) in the same volume.

Despite the increasing application of this technology in a range of countries such as the Netherlands, Australia, Brazil, Poland and South Africa, full-scale implementation in North America has awaited this unique public/private partnership in Rockford. In January 2017, the first AquaNereda AGS system was commissioned at RRWRD in Rockford, IL. This 31.5 m^3/hour (200,000 gpd) system was planned to demonstrate the first use of AGS technology at a typical U.S. wastewater treatment facility.

The facility consists of a 380 m^3 (100,000 gallon) ASG reactor and associated 57 m^3 (15,000 gallon) sludge buffer tank. The importance of this potentially disruptive technology was recognized by other equipment manufacturers who joined the effort and provided major equipment such as blowers, pumps, electrical components, grinder pumps and instrumentation. Ground broke on June 7, 2017 and the system was substantially complete by January 2018.

Influent is drawn directly from RRWRD's Parshall flume following vortex grit removal and 9.5 mm (3/8 inch) perforated screen using a 40 HP Model T2 centrifugal pump (Gorman Rupp, Mansfield, OH). An inline Muffin Monster Series K10 wipes-ready sewage grinder (JWC Environmental, Santa Ana, CA) was used during the operational period prior to RRWRD's installation of the new screens. The AGS reactor is aerated with two 25 HP GM10-S rotary lobed, positive displacement blowers (Aerzen, Coatesville, PA) and fine bubble-disc membrane diffusers (Aquarius, Port Washington, WI). Sludge transfer from the AGS and sludge buffer tank is performed with a 7.5 HP model XB-3 Rotary Lobe pump (Netzsch, Exton PA). Primary influent is distributed along the bottom of the reactor and effluent is drawn from a v-notch weir located at a 6.5 m (21.5 ft) depth. Sludge is withdrawn from a withdrawal pipe controlled with an electrically actuated plug valve.

Aqua MegaDisk and AquaDisk inside the Research Facility

The AGS reactor is monitored by the following sensors: Viomax CAS51D NO3-N, Memosens CPS16D pH/ORP, Oxymay COS61D dissolved oxygen, Turbimax CUS51D total suspended solids (turbidity), Promag L 400 magnetic flow meter, t-mass B150 6BABL thermal mass flow meter, FMR20 Radar Level Sensor. On-line analysers include the Liquiline CA80AM NH_4-N and CA80PH PO_4-P with sample preparation using two liquiline CAT820 filter/sample systems (Endress+Hauser, Inc., Greenwood, IN).

TABLE 1. SYSTEM PERFORMANCE DURING START-UP (JANUARY TO APRIL 2018)

Constituent	Constituent concentrations, mg/L				Average removal efficiency, %
	AGS influent		AGS effluent		
	Range	Average	Range	Average	
TSS	68-400	138	1-47	9	93
COD	144-847	261	5-76	29	89
NH_4-N	6-28	16	0.013-8.7	1.0	94
Total N	11-30	20	2.6-10.0	7.2	64
Total P	1.0-5.3	2.9	0.02-3.0	0.49	83

***Values based 24-hour composite samples*

The partnership was able to gain enough operating experience to present successful operating results at WEFTEC 2019.

The Nereda process operation is an SBR arrangement, taking advantage of certain design and operational aspects such as single-tank reaction, sedimentation and clarification in addition to true-batch reaction. However, the rapidly settling granules permit unique advantages over conventional SBR design. For example, unlike typical SBR operation, the Nereda process requires no water level change for fill/discharge. A modest water level change occurs during solids wasting, but the level remains fixed during the coupled filling and drawing step.

Granules originating from the existing Garmerwolde Nereda facility in the Netherlands were transferred to the AGS concrete basin on December 15, 2017. Interim operation began on January 7, 2018 until the supervisory control and data acquisition system (SCADA) and instrumentation were placed online in mid-February.

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Aqua-Aerobics Research Facility on RRWRD Plant Site

The first five months of operation were used to observe granule growth and the time required to reach key COD, TSS, TP, NH_4-N and TN targets. Results showed that the process is capable of treating conventional pollutants and nutrients to levels that might be expected of typical US wastewater treatment facilities. Table 1 shows average results during the start-up phase of the plant. Further refinements in operation are expected to provide consistently excellent effluent performance, and demonstrate energy and operational benefits of the process.

The facility continues to operate, providing ongoing benefits. The facility offers a source of seed sludge for the start-up of new AGS facilities, eliminating the need to import seed sludge from overseas. AGS operational and performance capabilities are being validated on North American wastewater characteristics to attain cold-weather BNR aligned with anticipated ultra-low TP and TN limits. The facility furnishes a training facility that supports the educational needs of prospective plant operators to adapt existing activated sludge knowledge and practices to AGS technology. And, of course, the facility provides treatment for a portion of RRWRD's wastewater flow, helping control their overall cost to operate.

*Please note: Aqua-Aerobic Systems, Inc. is a LIFT affiliate. CS

Cost-effectively meet regulation for nutrient discharge requirements

Utilizing the Advanced Biological Nutrient Recovery (ABNR™) system from CLEARAS Water Recovery, a chemical-free, biological wastewater treatment solution, enables you to achieve ultra low-level nutrient results for best-in-class water quality.

THE ABNR SOLUTION:

- **ZERO-WASTE SOLUTION THAT CREATES AN INCOME-PRODUCING BY-PRODUCT**
- **RELIABLE & PROVEN**
- **LOWERS O&M COSTS WITH A CHEMICAL-FREE SYSTEM**
- **ELIMINATES DISPOSAL OF HARMFUL BY-PRODUCTS**
- **EASILY INTEGRATES WITH FACILITY USING FLEXIBLE & MODULAR DESIGN**

Phosphorus and nitrogen loaded wastewater is mixed with a bio-diverse blend of algae and other micro-biology to initiate recovery (Mixture Flow).

The Mixture Flow enters a photo-bioreactor which optimizes biological activity where phosphorus, nitrogen and carbon dioxide are rapidly consumed.

The wastewater, now free of nutrients, is separated from algae and other microorganisms resulting in oxygenated clean water stream for discharge or resuse and a biomass recycle stream which is returned to mix state to re-initiate the treatment process.

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THE VILLAGE OF ROBERTS WASTEWATER TREATMENT FACILITY

HOSTS GROUNDBREAKING EVENT FOR THE CLEARAS ADVANCED BIOLOGICAL NUTRIENT RECOVERY SYSTEM INSTALL

The Village of Roberts wastewater treatment facility in St. Croix County, WI hosted its ground-breaking event for the upcoming integration of CLEARAS Water Recovery's Advanced Biological Nutrient Recovery (ABNR™) System. Roberts is implementing a 0.15 million gallon per day ABNR system to address the facility's upcoming total phosphorus discharge limit of <0.04 mg/L into Twin Lakes. ABNR will also address the facility's long-term goals related to future, anticipated nitrogen discharge limits.

"Given the State of Wisconsin's emphasis on water quality, the Village of Roberts set out to identify and implement a sustainable solution that could meet both our current and future, anticipated regulatory requirements," said John Bond, Public Works Director. "ABNR performed exceptionally well in pilot studies, met our criteria of bolting on to existing infrastructure and proved to be a more competitive total cost of ownership over time than other alternatives. We are eager to get the project constructed and operating by the Spring/Summer of 2020."

"We are thrilled to have met this key milestone and look forward to the day when the facility is producing extremely high-quality water while generating algae biomaterial, which provides a long-term recurring income stream to the Village of Roberts. The leadership and vision of the Village president, council and staff have been instrumental in getting to this point," said Jordan Lind, CEO of CLEARAS Water Recovery. He continued, "EPA Region 5 represents a strong market opportunity for ABNR technology given its ability to sustainably meet current and future nutrient discharge requirements. Several additional plants are in design within the region and will benefit from the Village of Roberts leading the charge on implementing ABNR."

The Roberts facility is designed to feed 150,000 gallons per day with a total phosphorus concentration of 4.0 mg/L to the ABNR system, generating approximately 400 pounds of algae biomaterial each day. System commissioning is planned for Spring / Summer of 2020. Major partners in the project include: Weston Solutions, Mulcahy Shaw Water, KOCH Membrane Systems, SCHOTT North America, Flottweg, Nexus Greenhouse Systems and Borger.

About The Village of Roberts, WI

The Village of Roberts was first settled in 1875. Today the Village has 1,750 residents. Roberts, WI, known as the good neighbour community, welcomes business and residential development. The small-town atmosphere of Roberts offers you the opportunity to live close to the Twin Cities metro area while enjoying quiet neighborhoods, excellent schools and exceptional natural resources.

About CLEARAS Water Recovery

Founded in 2008, CLEARAS set out to be the leader in providing natural wastewater treatment solutions that transform waste into value – delivering unique cost recovery opportunities to customers. In 2010, CLEARAS designed and built its first Advanced Biological Nutrient Recovery (ABNR™) system. This ABNR system delivered a simple, and chemical-free biological wastewater treatment solution to achieve ultra-low nutrient results. Today, ABNR technology is at the forefront of a paradigm shift in wastewater treatment from removal to recovery. Through a unique application of biomimicry, ABNR leverages and enhances nature's time-tested patterns of nutrient recovery by transferring the problem – algae blooms – into the solution. CS

GLOBAL WATER STEWARDSHIP:
LA FORTUNA, COSTA RICA

Parque La Fortuna with Arenal Volcano in Background

2019-20 Problem Statement

PROJECT UNDERSTANDING

- **Location:** La Fortuna, Costa Rica
- **Population:** 15,500
- **Number of Water Services:** 3,000
- **Water Usage:** See Project Considerations Section
- **Average Precipitation:** 3500mm
- **Average Temperature:** 25 Degrees Celsius
- **Typical Influent Characteristics;**
  - Parameter
    - BOD5 = 280 mg/l
    - TSS = 220 mg/l
- **Required Effluent Characteristics;**
  - Parameter
    - BOD_5 = 50 mg/l
    - TSS = 50 mg/l
    - Total Nitrogen= 50 mg/L
    - Fecal Coliform = only applicable for water reuse, refer to "Reglamento de Vertido y Reuso de Aguas Residuales" Table 7.

Costa Rica has very few centralized treatment systems. In rural areas, septic tanks are a common way of treating wastewater; greywater is often discharged directly overland. The leach fields are very small and very shallow. The law states the leach fields must stay within each individual property, however they often do not. Shallow bedrock and poor soils, as well as poor design, cleaning and maintenance practices, often contribute to improper treatment of septic tank effluent. Further exasperating the issue, it is not uncommon for sludge cisterns to dump collected material in rural areas (polluting) instead of trucking the sludge to a distance WWTF.

The area of concern is a collection of communities known as La Fortuna, Costa Rica. La Fortuna is located in north central Costa Rica in the Alajuela Province. It is located 18 kilometers from Arenal Volcano National Park and 140 kilometers from San Jose. It is officially known as La Fortuna de San Carlos. La Fortuna is significantly developed compared to a typical rural Costa Rican community.

GLOBAL WATER STEWARDSHIP

The planning area is composed of several smaller communities including La Fortuna, Zeta Trece, and Barrio Dora. These areas are mainly residential with a heavy dependence on tourism (hotels, restaurants and shops). The region hosts roughly 250,000 tourists per year. Roughly 3/4 of the tourists visit between November and June. A centralized sanitary wastewater solution is desired along with a reliable collection/conveyance system.

The residential population is relatively steady with no current plans for major developments, or significant residential population growth. However, as tourism grows in the region, more businesses and residents may move in. Assume a residential population growth of no more than 2% per year, and tourism growth of no more than 4% growth per year.

Although almost every home and business own a private septic tank, there are three (3) private treatment systems within the community. Costa Rica's electrical grid consists of 110-volt power, a combination of single phase and three phase and unexpected power outages do occur. For the La Fortuna design, assume that three-phase power will be readily available.

The local utility has been proactive in seeking a centralized wastewater treatment solution and would like a preliminary conceptual design of a treatment system along with a collection system. The design team must propose three (3) locations for the treatment site. Additionally, the design team must propose three (3) alternative treatment systems (each system may be one type of treatment or a series of treatment processes). The community is very interested in the idea of an energy neutral treatment process and the design team should hold this community interest in high regard while considering treatment alternatives. A feasibility report must be developed that examines an energy neutral system.

Given the complexity and status of the project, the design team must work on **an optimal site selection** and **a preliminary design proposal**. The design should be as intensive as possible (design the actual hp of pumps, actual diameter of pipes, accurate elevations and stationing, etc.).

La Fortuna, unlike most Costa Rican communities, has one government owned site that has been set aside for a future wastewater treatment site. When considering three (3) locations for the centralized treatment site, **note that the government owned site should be one (1) of the three (3) proposed sites.** For the design team's final recommendation for ideal site location one should consider proximity to the La Fortuna community while also considering cost to acquire new land.

In Costa Rica, especially in rural areas, toilet paper is not disposed of in the toilet. This is due to low water pressure, smaller pipe sizes and general goal to reduce solids entering into septic tanks or treatment systems. Used toilet paper is typically collected in trashcans and is disposed of along with other solid waste. Design of wastewater collection and treatment improvements should follow Costa Rican design standards as much as possible, otherwise typical U.S standards.

It is Costa Rican law that the property owner is responsible for their individual connection to the sewer main, however, it is necessary to plan for funding the entire connection. It is also Costa Rican law that if you have water service once a sewer main is constructed in front of a property, the property owner must pay for the service whether they chose to connect to the system or not.

PROJECT CONSIDERATIONS

- La Fortuna has provided water consumption data. This data is available in the Google Drive folder. The community has also provided the official design standards for potable and sanitation treatment systems. Section 5 of the design standards cover sanitation systems.
  Minimum water consumption per Costa Rican design standards are as follows:
  Rural Areas: 200 Liters/person/day
  Urban Areas: 300 Liters/person/day
  Coastal Areas: 375 Liters/person/day
  Metropolitan Area: 375 Liters/person/day
- Wastewater production can be estimated assuming 80% of water consumed/person will be sent to the sanitary system. For more information, refer to Section 5.3 of the Costa Rican design standards.
- Water consumption data should be analyzed and compared to the given minimum water consumption guidelines.
- Infiltration flow for PVC pipe material is 0.25 Liters/sec/km.

PROJECT APPROACH

For this project, CSWEA is soliciting designs for a long-term solution to the sanitation problem in this region. In general, the solution approach should be to design a centralized treatment system with a complete collection system.
Additional Information can be found by using the following link. Note that the link may need to be copy-pasted into the URL.
https://bit.ly/2FXYhXh

ADDITIONAL PROJECT CONSIDERATIONS

The specific areas of concern with the collection and wastewater treatment system are described as follows:

1. The treatment facility must be adequately sized for anticipated flow, future growth, with seasonal rainfall variability taken into account.
2. Seasonal variability of flows due to tourism should also be taken into account.
3. Treatment facility should be designed to be able to treat the effluent to meet the limits as described in this document.
4. Due to the socioeconomic status of the community, user fees must be lower than 5,000 colones, per month.
5. The location of the treatment facility needs to be easily attainable and needs to be located in an area that is not at risk of flooding and landslides. Additionally, be aware of and protect existing drinking water sources. Treatment site location also needs to be evaluated for ease of construction and potential impacts on nearby homes and businesses. The average and maximum flows for the proposed collection system need to be determined.

DESIGN OBJECTIVES & CONSTRAINTS

The following are the items that should be discussed or implemented as part of the design project. The design that best accomplishes these goals will have the highest likelihood of longterm success.

1. The project must take into consideration the local climate (temperature and heavy rainfall) and high variability due to tourism.
2. Avoid offensive odors and minimize impacts on landscape aesthetics.
3. The equipment must have a level of redundancy to maintain treatment if some equipment is in temporary disrepair.
4. The solution must utilize a minimum of space and energy. Special consideration will be given to designs that are energy efficient and/or partially self-sustaining from an energy standpoint.
5. The project capital cost must be minimized.
6. The system must be easy to operate and maintain. There is no wastewater training available in the area or wastewater operators' associations. Local staff will have to be trained on the system operation and maintenance, but may be available only on a part-time basis, so the system should be fairly self-operational.
7. The wastewater treatment equipment must be easily replaceable with parts readily available.
8. Treatment equipment must be compatible with the existing electrical system.
9. Consider simplicity (less O&M the better) in design whenever possible.
10. It is recommended that the teams design for the year 2040 (20 years). Provide justification with any variances.
11. Use best engineering judgement in consideration of separation requirements for potable water and sewer main. Potable water typically runs along the road Right-of-Way.
12. Design must follow Costa Rican design standards for wastewater systems, refer to section 5 of the document.

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Global Water Stewardship (GWS) Donor Spotlight:

DAHME MECHANICAL INDUSTRIES, INC.

DMI
DAHME MECHANICAL INDUSTRIES, INC.

WHAT KIND OF WORK DOES DAHME DO?

Dahme Mechanical Industries, Inc. (DMI, Inc.) is a mid-sized process mechanical and plumbing piping contractor that specializes in water and wastewater treatment construction. We offer a variety of services to our customers, ranging from very modest repair work to multi-million dollar facility upgrades and new construction. In the past 25 years, DMI, Inc. has performed work in one manner or another in most municipalities in the Northern Illinois, with a majority of our clients being located in the Chicago Metropolitan area.

HOW DID YOU FIRST GET INVOLVED IN WITH WASTEWATER WORK?

I was 25 years old, two years past my active duty army enlistment, and had just gotten my Associates degree at College of DuPage. I was preparing to go to DePaul as an English Education major in the fall of 1997 and my future father-in-law, Neil Lindberg, presented me with an opportunity to go to work with him at a small mechanical contractor at which he was employed. He mentored me over a seven-year period and his tutelage and friendship is a big reason I am in the position I am today. I always had an interest in construction and was young enough when I started in this industry that I felt I could always switch gears and go back to school if it wasn't working out. Evidently, it worked out.

CSWEA

GLOBAL WATER
STEWARDSHIP

WHAT DO YOU FIND MOST CHALLENGING ABOUT YOUR WORK WITH WASTEWATER TREATMENT?

Being on the contractor side of construction presents unique challenges separate from the design and operation of wastewater collections, pumping, and treatment facilities. More often than not, it seems the expected dynamic during construction is that there will be a Contractor vs. Owner/Engineer relationship. That narrative runs counter to what we do at DMI, Inc. The challenge is to not just promise a good product, but to deliver it, and to do so in a manner that is as seamless and conflict-free as possible. We make a concerted effort to develop and maintain relationships with the other contractors, consultants, and end users that we work both with and for, and solidly believe that effort shows in the delivery of our services.

WHAT ARE INTERESTING/UNIQUE STORIES OR PROJECTS YOU'VE WORKED ON?

The municipal wastewater industry seems to have a disproportionate amount of interesting characters, facilities, and construction opportunities as opposed to other sectors of construction, and not a day goes by without hearing about or witnessing something unique and worth passing along. Among the most unique things we have been hired for include building a 100' long floating dock and pump pontoon retrieval raft on a wastewater lagoon. We were recently asked to develop some reuse water aquaponics gardening concepts by a customer. We are currently engaged in a Bio-P pilot study implementation, and have been contracted in various Design-Build projects that focus in several areas of improvements, from traditional facility upgrades to larger integration, energy efficiency and energy recovery efforts.

WHAT DO YOU WISH MORE PEOPLE KNEW ABOUT DAHME?

Every DMI tradesman that physically performs the work has the same desire to succeed, as does the management. The mechanical technicians that work on my projects are as engaged with the clientele as I am, and sometimes more so – and this is a huge asset to our operations. There are equal amounts of technical proficiency, accountability, and pride in the work being done by everyone at DMI that is involved in our projects.

"Being part of a developed country that takes sanitation and clean water for granted makes it easy to ignore that over 10% of world does not have access to potable water and over 30% has no access to personal washroom facilities."

WHAT'S YOUR PERSONAL PHILOSOPHY ON WHAT SHOULD BE DONE ABOUT AVAILABILITY OF WASTEWATER TREATMENT IN THE DEVELOPING WORLD?

Being part of a developed country that takes sanitation and clean water for granted makes it easy to ignore that over 10% of world does not have access to potable water and over 30% has no access to personal washroom facilities. Those are population numbers that are acknowledged by several global health monitoring agencies – yet it is still difficult to accept that those are measurable and quantifiable figures, albeit tragic ones. Over 20 years of wastewater construction experience has shown to me that while there are extremely complicated and expensive ways to provide these resources to the public – there are more importantly very simple, efficient, and inexpensive ways to ensure a population has access to one of the most basic human rights – sanitation.

IS THERE ANYTHING ELSE YOU WOULD LIKE TO TELL ME ABOUT DAHME OR YOUR CHOICE TO SUPPORT GWS?

I only recently realized the level of commitment and sustained efforts of our local industry representatives to support wastewater treatment design and construction in the economically depressed and developing areas of the world. It never registered that so many of my friends and colleagues were so committed and passionate about this worthwhile cause. I am new to the concept of outreach in this arena, and will continue to look at ways to participate and contribute towards the GWS mission.

Kris Komorn
Dahme Mechanical Industries, Inc.
847-212-1147 CS

CSWEA 2020 EVENTS CALENDAR

FEBRUARY

Operator Training Course #14731: Fundamentals of Maintenance Practices Ilake
February 6
County Public Works | Libertyville, IL

Wisconsin Government Affairs Seminar
February 20
Fond du Lac Radisson | Fond du Lac, WI

2020 AWWA/WEF YP Summit
February 24-25
Hyatt Regency Orange County
Anaheim, CA

MARCH

2020 WI Spring Biosolids Symposium
March 17

APRIL

Midwest Student Design Competition
April 6
Monona Terrace | Madison, WI

25th Annual Education Seminar
April 7
Monona Terrace | Madison, WI

MAY

CSWEA 93rd Annual Meeting
May 18-20
River Centre | Saint Paul, MN

JUNE

2020 IL Stormwater/ Collections Systems Conference
June 24
NIU – Naperville Campus | Naperville, IL

SEPTEMBER

Collections Workshop w/ MWOA (Duluth)
September 30
Duluth, MN

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WEF/Central States WEA
Membership Application 2020

Water Environment Federation
the water quality people

Personal Information

Last Name	M.I.	First Name	(Jr., Sr., etc.)
Business Name *(if applicable)*			
Street or P.O. Box ❑ Business Address ❑ Home Address			
City	State	Zip	Country
Home Phone Number	Mobile Number	Business Phone Number	
E-mail Address to receive *WEF Highlights Online*		Date of Birth (mm/yyyy):	

❑ Please send me information on special offers, discounts, training and educational events, and new product information to enhance my career.

Demographic Information

The following is requested for informational purposes only. **Gender:** ☐ Female ☐ Male

Education: ☐ Doctorate ☐ MA/MBA/MS ☐ BA/BS ☐ AA/AAS ☐ Technical School ☐ High School

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Referring member's name:	Referring member's email address:

Membership Information

Membership Categories (select one only)		**Member Benefit Subscription**	**Dues**
☐ **Professional**	Individuals involved in or interested in water quality.	✔ *WE&T* (including *Operations Forum*) ✔ *Water Environment Research* (Online) ✔ *WEF Smart Brief* ✔ *Central States Water Magazine*	$170.00
☐ **Executive**	Upper level managers interested in an expanded suite of WEF products/services.	✔ *WE&T* (including *Operations Forum*) ✔ *World Water* ✔ *Water Environment Research* (Online) ✔ *WEF Smart Brief* ✔ *Central States Water Magazine*	$340.00
☐ **Professional Operator**	Individuals involved in the day-to-day operation of wastewater collection, treatment or laboratory facility, or for facilities with a daily flow of < 1 mgd or 40 L/sec. **License #:** _____	✔ *WE&T* (including *Operations Forum*) ✔ *Water Environment Research* (Online) ✔ *WEF Smart Brief* ✔ *Central States Water Magazine*	$105.00
☐ **Young Professional (YP)**	WEF members or former WEF Student members with 5 or less years of experience in the industry and less than 35 years of age. This package is available for 3 years.	✔ *WE&T* (including *Operations Forum*) ✔ *Water Environment Research* (Online) ✔ *WEF Smart Brief* ✔ *Central States Water Magazine*	$64.00
☐ **Student**	Must be enrolled for a minimum of six credit hours in an accredited college or university. Must provide written documentation on school letterhead verifying status, signed by an advisor or faculty member.	✔ *WE&T* (including *Operations Forum*) ✔ *Water Environment Research* (Online) ✔ *WEF Smart Brief* ✔ *Central States Water Magazine*	$20.00
☐ **Corporate**	**One person is entitled to receive member benefits.** Companies engaged in the design, construction, operation or management of water quality systems. **Designate one membership contact.**	✔ *WE&T* (including *Operations Forum*) ✔ *Water Environment Research* (Online) ✔ *WEF Smart Brief* ✔ *Central States Water Magazine*	$393.00

Additional Subscriptions

Dependent upon your membership, $55, $47, or $20 of your membership dues is allocated towards a subscription of Water Environment & Technology (WE&T) magazine that is non-deductible from the membership dues.

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❑ *World Water: Stormwater Management*	$55	$

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WEF/Central States WEA
Membership Application 2020

MEMBERSHIP PROFILE

Please take a few moments to tell us about your background and professional interests.

1. What is the nature of your ORGANIZATION? (circle one only) - required

01 Public/Private, Wastewater and/or Drinking Water and/or Stormwater
02 Public/Private Wastewater only
03 Public/Private Drinking Water only
04 Industrial Systems/Plants
05 Consulting or Contracting Firm
06 State, Federal, Regional Government Agency
07 Research or Analytical Laboratories
08 Educational Institution
09 Manufacturer of Water/Wastewater/Stormwater Equipment or Products
10 Water/Wastewater/Stormwater Product Distributor or Manufacturer's Rep.
11 Public/Private Stormwater (MS4) Program Only
12 Public Finance, Investment, and Banking
13 Non-profits
99 Other (please specify) _____

2. What is your Primary JOB FUNCTION? (circle one only) (JOB)

01 Management: Upper or Senior
02 Management: Engineering, Laboratory, Operations, Inspection, Maintenance
03 Engineering & Design Staff
04 Scientific & Research Staff
05 Operations/Inspection & Maintenance
06 Purchasing/Marketing/Sales
07 Educator
08 Student
09 Elected or Appointed Public Official
10 Other (please specify) _____

3. What areas do you consider to be your KEY FOCUS AREAS? (circle all that apply) (FOC)

01 Collection Systems
02 Drinking Water
03 Industrial Water/Wastewater/Process Water
04 Groundwater
05 Odor/Air Emissions
06 Land and Soil Systems
07 Legislation (Policy, Legislation, Regulation)
08 Public Education/Information
09 Residuals/Sludge/Biosolids/Solid Waste
10 Stormwater Management/Floodplain Management/Wet Weather
11 Toxic and Hazardous Material
12 Utility Management and Environmental
13 Wastewater
14 Water Reuse and/or Recycle
15 Watershed/Surface Water Systems
16 Water/Wastewater Analysis and Health/Safety Water Systems
17 Other _____

4. Optional Items (OPT)

Education/Concentration Area(s) (CON)

1. Physical Sciences (Chemistry, Physics, etc.)
2. Biological Sciences
3. Engineering Sciences
4. Liberal Arts
5. Law
6. Business

COMPANY	PAGE	TELEPHONE	WEBSITE
Advanced Aquaculteral Technologies, Inc.	17	574-457-6193	www.advancedaquaculturaltechnologies.com
Advanced Engineering and Environmental Services (AE2S)	6	763-463-5036	www.ae2s.com
AECOM	57	312-373-7700	www.aecom.com
Badger Meter, Inc.	3	800-876-3837	www.badgermeter.com
Baxter & Woodman, Inc	64	815-459-1260	www.baxterwoodman.com
Bolton & Menk, Inc.	34	507-625-4171	www.bolton-menk.com
Brown and Caldwell	57	651-298-0710	BrownandCaldwell.com
Burns & McDonnell	56		www.burnsmcd.com
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Centrisys/CNP	20	262-654-6006	www.centrisys-cnp.com
Clark Dietz, Inc.	63	262-657-1550	www.clark-dietz.com
CLEARAS Water Recovery	50	541-930-3201	www.clearaswater.com
Crawford, Murphy & Tilly, Inc.	64	217-787-8050	www.cmtengr.com
Deuchler Engineering	45	630-897-4651	www.deuchler.com
Donohue & Associates, Inc.	68	888-736-6648	www.donohue-associates.com
Energenecs	63	262-377-6360	www.energenecs.com
Energy Systems Group	49		www.energysystemsgroup.com
Environmental Dynamics International (EDI)	4	573-474-9456	www.wastewater.com
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Greeley and Hansen	35	800-837-9779	www.greeley-hansen.com
Hawkins Water Treatment Group	8	800-328-5460	www.hawkinsinc.com
HR Green, Inc.	57	800-728-7805	www.hrgreen.com
Industrial & Environmental Concepts, Inc.	19	952-829-0731	www.ieccovers.com
InfoSense, Inc.	3	877-747-3245	www.infosense.com
JDV Equipment Corporation	58	973-366-6556	www.jdvequipment.com
Kanaflex Corp. USA	52	224-545-2012	www.kanaflexcorp.com
Krohne, Inc.	52	800-356-9464	www.krohne.com
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Pittsburg Tank & Tower	57	270-826-9000	www.pttg.com
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Reiss Engineering	28	407-679-5358	www.reisseng.com
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SEH	35	651-490-2000	www.sehinc.com
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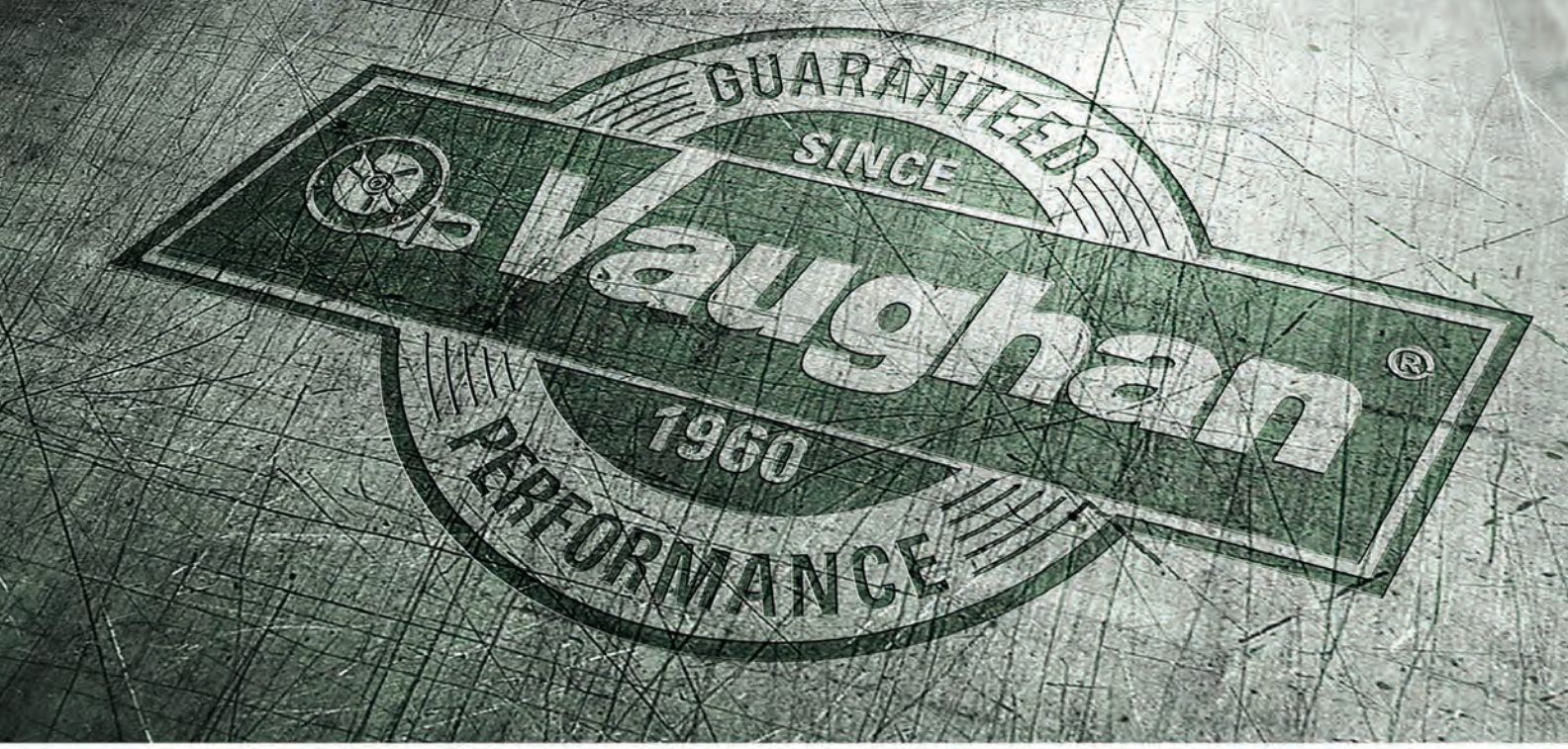

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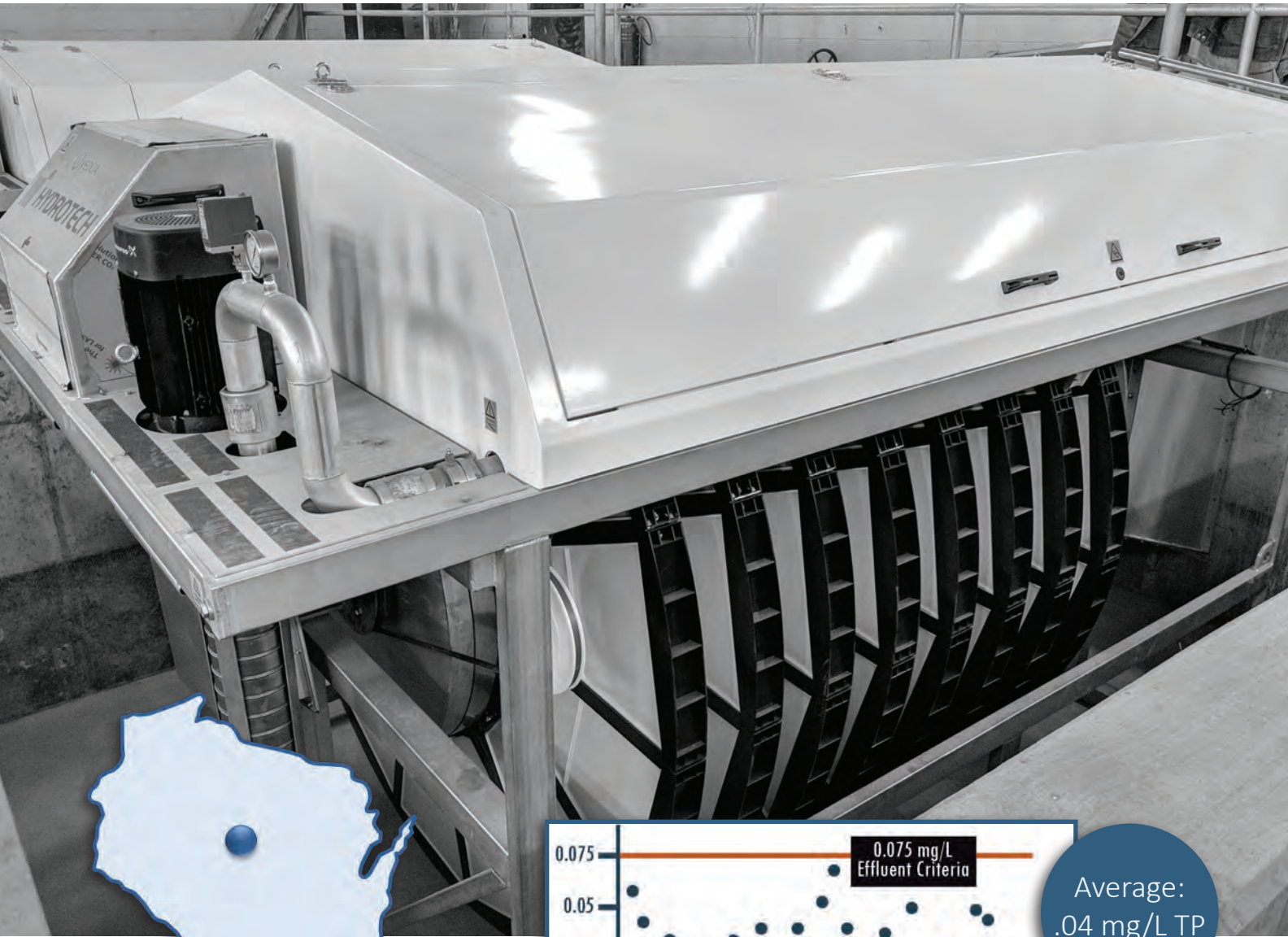

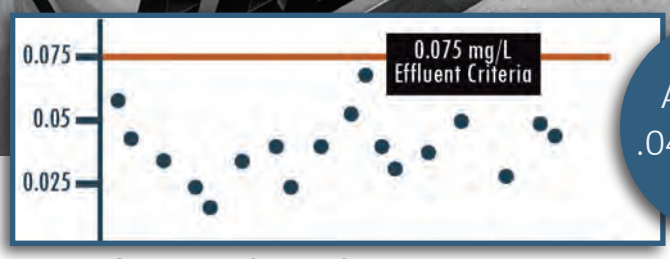

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