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CSWEA

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Perception and a Little of Your Time

By Jim Huchel

Well it's the end of summer already, CSX is in the books, and oh-so-quickly my tenure as president is moving along. In no time, some of us will be in New Orleans at WEFTEC 2014. I will be halfway through my term as CSWEA president. In my first article I wrote about my passion, in this edition I feel that it's important to take the time to identify what can be done to improve people's perception about our profession.

About seven years ago, I decided it was time to give back to the organizations that have helped me over my career. I started in my local organization where I would teach classes to help operators pass their certification exams. I don't always find out how they did, but from time to time, people will stop me at functions and thank me for helping them to prepare for, and ultimately pass, their exam. I will tell you there are no prouder moments in my career than those.

I became active in the Illinois section of CSWEA by working on, and chairing my first committee. From there the fun really began. Through the years, I have met and worked with some very amazing, talented people. We helped teach operators, and we learned from operators, engineers, and consultants. The time we spent actually "working" was minimal, but the reward was the friendships that I made will last the rest of my life. I can't emphasize enough how important this first step was. Do as much or as little as you can. You'll be an asset to the organization and will develop relationships with your peers that will be a tremendous personal and professional asset. If you don't know who to contact, check the website, or contact me – as many will tell you, I love to volunteer people for committees.

It wasn't long before I was nominated to second vice chair on the executive committee. That proud moment set me on my path to lead this organization. I spent the next two years meeting people, making friends, and continuing my pursuit of trying to educate just about anyone who would listen about our field. I recently spoke at a local Rotary Club meeting where we discussed wastewater, dispelled some of the myths, and explained why it's bad to dump your medicine down the drain. I was rewarded with "thank you, I didn't know…" and "…by the way, we're having a pig roast would you like to attend."

It's my passion to educate that drives me, from our staff at the city, to local operators, to the public, and even at times some of my engineering friends. Remember, everyone is here not to judge you, but to learn from you. Those words have stuck with me and now I pass them onto you.

I wish you all a safe and happy fall! If you're at WEFTEC and you see me, please don't hesitate to stop me and introduce yourself. I'd love to meet with you. CS

WEF Delegates Report

By Rusty Schroedel and Eric Lecuyer

TRANSITIONS

Rusty Schroedel will rotate off of the WEF House of Delegates (HOD) after the first half of the HOD meeting in New Orleans at WEFTEC. Rusty has served Central States in one role or another throughout his long tenure in the wastewater profession, which included his term as President in 2009-10. At the same time, Rusty has served WEF in many capacities including as Awards Committee Chair as well as on many other committees, HOD Work Groups and upon many technical practice manuals review teams. Both Central States and WEF are greatly indebted to Rusty for his past service and his ongoing commitment to the association, federation and the water environment. Incoming WEF Delegate Doug Henrichsen's term will begin during the second half of the HOD's meeting in New Orleans as he will replace Rusty on the HOD as well as on the Central States Executive Committee. While having big shoes to fill, Doug's past experience and service to Central States are sure to guide him as part of the delegation that represents Central States members on the House of Delegates.

From Rusty: I want to thank all of you for the opportunity to serve Central States for the past several years. We have a great member association (MA) and, with your continued participation and support, we will continue to be able to provide high quality programs and services.

WEF HOD WORK GROUP UPDATE

The WEF House of Delegates Standing Committees and Work Groups are wrapping up their work and preparing reports to be shared with the full HOD at WEFTEC in September. Rusty Schroedel continues to serve on the Strategic Planning WG and Eric Lecuyer on the MA Sustainability WG. Many of the Work Groups tasks are inward looking, how we can improve the House of Delegates, WEF, and better support MA's success and sustainability. The Nondispersibles WG continues to make good progress in raising public awareness of problems associated with using toilets as trashcans.

The HOD Work Groups are re-constituted as part of the HOD meeting at WEFTEC, with some WG's continuing, as more work can be done to advance the goals of that WG, while others are re-tooled with new goals to be achieved over the next year. The Strategic Planning workgroup is planned to be sunset. Delegates Eric and Doug may serve on as many HOD WG's and/or standing committees as they choose.

WEF DUES INCREASE

On July 19, 2014 the WEF Board of Trustees approved the Fiscal Year 2015 WEF budget, which includes a membership dues increase effective January 1, 2015.

This is only the second substantial dues increase in the past 10 years. The dues were increased by $7 to $13 (depending on the category) in 2014 and will be increased by $8 to $15 in 2015.

Historically WEF membership dues have been extremely low compared with other national and international associations for water professionals. After these increases, WEF dues still will remain comparatively low. The Board of Trustees has concluded that the practice of very occasional nominal rate increases has resulted in an unsustainable gap between WEF's dues and the actual value of membership benefits. To meet its commitment to the water sector and the water profession, WEF needs to close this gap. In addition to the 2014 and 2015 increases, additional increases likely will be needed in 2016 to close the gap further and provide new services sought by our members.

WEF will be implementing a dues increase for professional, academic, and PWO members, with all renewals and new memberships beginning January 1, 2015:

	2013	2014	2015
Professional WEF Dues	$ 88	$101	$116
Academic	$ 88	$101	$116
PWO	$ 47	$ 54	$ 62

WEF's membership rates traditionally have been the lowest among comparable national and international associations. Here are the dues for some comparable organizations.

2014 Dues Comparison	
Water Environment Federation	$101
International Water Association	$125
American Public Works Association	$174
American Water Works Association	$174
American Academy of Environmental Engineers & Scientists	$190
American Society of Civil Engineers	$225

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"WEF's goal is to develop state-of-the-profession technical programs and deliver exceptional customer service that maintains the federation's competitive position within the water sector."

During 2013, WEF conducted an in-depth examination of its pricing structure vs. the ability to remain competitive and continue to provide members with incomparable services and benefits.

WEF's goal is to develop state-of-the-profession technical programs and deliver exceptional customer service that maintains the federation's competitive position within the water sector. WEF consistently has increased the quantity of products and services and provided the highest quality of water education, networking, business opportunities, and value-added services to members and member associations without raising dues-which has contributed to the gap.

In addition to closing the gap between WEF's dues and the actual value of membership benefits, the increased dues revenues will be used to improve existing services and provide new ones sought by our members. These areas include the following:

- Investing in the WEF and MA Partnership, including additional dedicated staff to serve MAs, additional resources for technical staff participation/presentations in MA events, and increased financial support for WEFMAX meetings.
- Investing in volunteer partnership, including additional staff to support WEF committees, the House of Delegates, and website enhancements.
- Investing in the future with additional staff and seed funding to maintain command of key technical areas including stormwater, innovation, and resource recovery.
- Investing in membership growth and customer service, including a new dedicated membership/customer service staff group; and, review of overall operational effectiveness.

In addition, some specific and ongoing programs, budgeted by WEF, that serve as resources for member associations include:

- WEF member association and individual awards and recognition
- WEF board and staff support at MA annual conferences
- Membership dues billing and collection and rebates to MAs (dues collected on behalf of MAs are rebated to the MA)
- MA Resource Center website – links to all WEF resources and to specific resources for MA leaders
- Online membership reports
- WEFMAX meetings
- WEFTEC Leadership Day programs
- WEFLeader newsletter
- Leadership Summit
- WEFTEC House of Delegates meetings
- Staff participation in MA events – upon request and as resources allow
- WEFCOM MA Professional Staff and Leader Communities
- Water Advocates program

Some examples of programs for individual members include:

- *Water Environment & Technology* magazine
- Discounts on WEF conferences, books, training and other products and services
- Public policy programs
- Public education and outreach initiatives
- No-charge webcasts and technical information

WEF's overhead in the 2015 budget is 18.25%. This is in compliance with Board of Trustees adopted overhead goal of less than 25% and compares very favorably with that of similarly sized non-profit organizations.

In 2014 the percentage of WEF's revenues that comes from dues is 14%. With a 15% dues increase, the percentage of WEF's 2015 income budget that is associated with dues remains at 14%. For associations comparable to WEF, 27% is typical. CS

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Zero Discharge and Resource Recovery in Costa Rica

By Mohammed Haque

While on CSWEA's inaugural Global Initiative trip, a few of us water enthusiasts (David Arnott, Matt Streicher and I) had the experience of visiting a wastewater treatment plant in San Isidro, Costa Rica. I realize that to many people this just seems wrong. Why in the world would we want to see a wastewater treatment plant in a land where we could have spent the afternoon watching toucans, macaws and spider monkeys? I guess in some ways it is because keeping a clean environment is what allows such biodiversity and beautiful flora and fauna possible. So we went to the source to figure out how they operate things in Costa Rica, and through our partner, James Drews and his superb interpretation, we learned a little about this unique plant.

The Fumigadaro Alto Wastewater Treatment Plant is located next to the San Isidro Municipal WWTP in the Chirripo Mountain Range. Rogelio Quesada, the owner of the Fumigadaro group of companies, is a true entrepreneur. He runs a fumigation company, septic hauler, port-a-potty rental, and grease hauling. I have never met such an enthusiastic and passionate owner of a treatment plant. In many ways he reminded me of the enthusiasm that many of our operators and superintendents have for their respective plants. It was great to see his level of enthusiasm for a profession that is in many ways, hidden from view. We could tell he loved his plant and he loved what he was doing, and for very good reasons.

The Fumigadaro Alto WWTP is a very small plant (50,000 liters per day) that only accepts septic tank waste and grease trap waste. The plant is run with very little mechanical equipment. Rogelio relies on gravity, natural mixing, and the sun's rays for drying. Since most of his waste is relatively stable by the time it gets to his plant, and since water treatment standards are mild relative to the standards in the USA, the focus is more on sludge recycling. This is not to say that the water is not treated, but on this particular day there was no discharge and the water being stored in tanks was used for non-potable purposes at the plant.

The main product of the treatment plant is a dried sludge that is mixed with dirt and sold for approximately $4 per 50lb bag as Tierra Fértil. Tierra Fértil is a certified land application fertilizer in Costa Rica. Rogelio has created his own process of drying sludge where he gets the final product in to a nearly powder form and then mixes it with dirt to create a soil/dried sludge mix that he then sells back to the public. It is quite an ingenious setup that he has and one that we never expected to see in Costa Rica. Rogelio has created a great business model. He gets paid to haul in the sewage and also gets paid to dispose of the end product. It is the closest thing I have seen to zero discharge, nearly full resource recovery. The only thing he is missing is to capture methane to generate energy that he can then sell back to the adjacent municipal plant.

It is good to know that in the mountains of Costa Rica, our profession has passionate environmentalists like Rogelio who are running facilities and doing the same things that we strive to do here. We look forward to working with Fumigadaro Alto as we work on the Global Initiative in Piedras Blancas. Read all about it in the pages that follow. CS

Global Initiative: Piedras Blancas, Costa Rica

By Amanda Heller

At the end of August, a group of CSWEA members traveled to the southern portion of Costa Rica to help a small community resolve their wastewater issues. Through the Global Initiative (GI), chaired by Eric Lynne, a group of four CSWEA members, David Arnott, Mohammed Haque, Amanda Heller, and Matt Streicher, traveled to Piedras Blancas to begin the process of resolving the village's wastewater issues.

Why Piedras Blancas?

CSWEA's Mohammed Haque has several contacts and friends who live in Costa Rica, and has travelled the country extensively. Knowing him and his line of work and interests, he became aware of the wastewater treatment challenges in Costa Rica, primarily in villages away from typical tourist destinations. Through further contact with the Osa and Golfito Initiative through Stanford University (INOGO), Mohammed came to know of Piedras Blancas and realized it was a situation that needed immediate attention.

In February of 2014, Mohammed traveled to Piedras Blancas to do a short evaluation of the issue and to gain some contacts for a trip back later in the year. From what he gathered, he knew it was a village that was aware of the issue, but not the extent. He brought this back to Eric Lynne and the Executive Committee of CSWEA and they began to plan CSWEA's first GI program – Piedras Blancas.

The problem

Piedras Blancas is a small community created by the Costa Rican government in 2005 to house palm plantation workers. Its main subdivision began with 150 homes to hold five people per home. When the city streets and houses were built, a storm water and grey water collection system were also installed, and each home had its own septic tank for the black water. These systems worked well for several years to keep the city streets clear of standing water and isolate the black water from human contact.

Today, Piedras Blancas has approximately 157 homes (excluding squatters) averaging about eight people per home. It has grown to hold more people than originally designed, and this is apparent as you walk through the streets. As the group walked, gathering information from the locals about their plumbing issues, several key points stood out.

When the development was created in 2005, each home was built with its own septic tank to collect the black water from the house. One of the questions we asked was, "How often do you have your septic tank cleaned out?" Many of the responses came back as "Never," or "It's too expensive." Throughout the entire community, approximately 30-50 homes pumped their septic tanks, some homes on a yearly basis, others every few months. The charge to pump the tank ranged from $40 to $125 based on if the pumper truck had to come for multiple houses or just one. Those who did receive the pumping services were businesses, or seemingly the well-to-do families of the community.

Aerial View of Piedras Blancas courtesy of Aerial Media Costa Rica.

However, not all families opted out of pumping their septic tanks because of money, but because they physically could not access their tanks. When the homes were originally built, they were meant to suit five people. Since the majority of the homes now hold eight, additions were important. This meant that several additions were built directly over their septic tanks, making them no longer accessible

Local home with addition built over septic tank.

Peace Corps translator, Mark Green, discussing with surveyor points to be shot.

Children playing on the sidewalk while sewage water runs along the curb.

for the option of pumping. Creating the question, "If the septic tanks are never pumped, where does the sewage go?"

As we walked through the city streets, the smell of sewage was apparent, and in some instances, visible. It was obvious not all black water was plumbed to the septic tank. At one house we were able to look inside of the septic tank to see the construction and the waste that was being piped to the tank. The tank looked to be holding mostly grey water and had not reached the overflow outlet to the leachate field. When we asked the owner, they noted that the septic tank has never been pumped since they moved in six years ago. With the tank never pumped, and the water not at the overflow, there had to be a crack in the tank. The owner mentioned that during periods of heavy rain (which occurs four months out of the year) the back yard has a terrible smell.

The sewage was not only making its way to the streets, but also flooding the backyards of the village. The plumbing between the houses was not consistent and endangering the community. With the sewage seeping into the ground outside of the houses where the water pipes were installed, the waste was directly in contact with the potable water supply. Community members have mentioned how when children play in the streets they get sick, and how their potable water is contaminated.

This issue has gone beyond the point of dirty water or a foul smell. It has escalated to not only harming the environment, but also spreading illness. Piedras Blancas is in need of a better way to handle their wastewater, to be able to protect the environment as well as their community.

Data gathering

Not only did we gather information by talking to the locals, but we also hired a few entities to help in the data-gathering process. Since this is a location that we will not be able to visit frequently during the design process, and since the design criteria will need to be turned over to students for the upcoming CSWEA Student Design Competition, we needed to gather as much data as possible during our short visit.

A surveyor, Ingenieria Satelital, came and took numerous shots for the layout of the village, the water boxes, elevations of the streets, slabs on grade, as well as the layout of an area where a wastewater treatment facility may be constructed. The outfit was surveying Piedras Blancas for several hours on Friday, August 29 as well as a few additional hours on Saturday, August 30. The survey has now been turned over to CSWEA for interpretation and to be included in the design competition information.

Chuck Chastain of Aerial Media Costa Rica come to Piedras Blancas. Chuck was able to provide aerial views through the use of his Drone and Go-Pro camera. We received hundreds of photos of the village as well as the storm water/grey water line that dumps into the Rio Piedras Blancas. This information will be beneficial to the students to get a feel for the community, as well as the space they have to work with for their system. Chuck was also able to provide an aerial fly-through video of the city, giving the viewers a feeling of presence in Piedras Blancas.

Unfortunately, we were unable to personally meet with our geotechnical outfit. Ingeotecnia de El General's representative Adrian Fallas Gamboa was arriving to Piedras Blancas the Tuesday after we left to take soil samples of the village's soil and possible construction site. Although we did a quick soil examination while we were in Piedras Blancas on Friday, Adrian will be providing detailed reports to CSWEA in the near future.

From the time this project was proposed in February to our short week on site, we gathered extremely valuable information for the design of a new system. With what seems to be having all bases covered, our last obstacle was bringing awareness to the village as well as gaining their support in this long but necessary process.

Festival attendees pose for a picture at the end of the day.

Israel Moya (Mr. Costa Rica), Matt Streicher, David Arnott, Diego Garcia, Amanda Heller, Mark Green, Mohammed Haque, Jehudi Quesada.

Community members and leaders showing their support in our mission.

Community awareness

During the weeks leading up to the CSWEA trip to Piedras Blancas, Diego Garcia, a resident and village leader in Piedras Blancas, began to talk to the locals to inform them of our mission and to invite them to the community awareness party we were holding. When we arrived the community knew why we were there and was accepting of our presence and end goal.

At the end of the week we hosted a party to bring the community together and to bring awareness to all in attendance about their problem and our mission to resolve this for the community. We were overjoyed by the outcome, and know our mission was made clear and the community has given us their support in every way they are able.

Diego spread the word of our arrival and the Saturday festival, which prompted great enthusiasm throughout the village. The children were preparing for the Costa Rican Independence day festivities with their drum line and baton crew at school, and we were able to witness their program at the festival. Children and their parents came to the Piedras Blancas community center to watch the program and to enjoy other activities. In attendance were numerous children from the Village, concerned adults, local leaders, and the local conservation arm of the government SINAC (equivalent to EPA or DNR of Costa Rica).

Food donated by CSWEA was cooked by locals and we were treated to some great galla pinto (rice and beans) as well as empanadas. Through Mohammed's travels and connections, he met Jehudi Quesada, a clown for Gorditas de Amor, and Isreal Moya, Mr. Costa Rica. Gorditas de Amor (Droplets of Love) provides children with entertaining shows throughout Costa Rica. They took the five-hour drive from San Jose to come entertain kids during the event. While the children were entertained by the clown and Mr. Costa Rica with games, prizes, candy, and most importantly, a bouncy house, we were able to discuss with locals their wastewater issue as well as other concerns they have.

Not only were villagers concerned about the wastewater, they were reaching out to CSWEA about their current drinking water problems. It is not a reliable source for cleanliness or availability, and they know this is another area of improvement. We were also shown plans

Participate

We are looking for volunteers who want to be involved with the Global Initiative. Volunteers are needed for trips to Costa Rica, as well as coordination of the student design competition. We are also looking for mentors to work with the student design teams as they look at this issue as a design challenge. If you are interested, please reach out to Eric Lynne, Global Initiative Chair at *elynne@donohue-associates.com* or Mohammed Haque, Executive Director at *mhaque@cswea.org*.

Support Us

CSWEA holds a silent auction at our annual meeting to generate funds for the Global Initiative. Please consider donating an item for the silent auction in May 2015. Direct donations are also encouraged and can be made at *http://www.cswea.org/donate*. Proceeds are used to fund travel costs and to perform work at the Piedras Blancas site. If you would like more information, please contact Eric Lynne, Global Initiative Chair at *elynne@donohue-associates.com* or Mohammed Haque, Executive Director at *mhaque@cswea.org*.

for a new community center, indicating the village wants to improve in multiple areas and is willing to support those who are eager to help.

During the fun and games, we gathered community members, local political leaders, conservation arm of the government, SINAC, to bring awareness to the issue running through their streets and taking over their yards, as well as to gain their support. Diego, being connected with Piedras Blancas, gave a passionate speech about the issue at hand. He covered not only how it is affecting the environment, but also the children and all who live in the community. He emphasized the need for the community's support to resolve this issue. We then had our translator, Mark Green, present our project and the steps we are taking to the community so that they understood our goals. Both speeches were very well received.

A community leader spoke on behalf of Piedras Blancas. She made it very clear that we have the support of Piedras Blancas, and only need to ask for whatever help we may need. Her passionate speech proved that as a community they understand their water and the issues. They want to go from the system they have now to one that will promote a healthy community as well as a healthy environment.

The results

With the data gathered, the support of the community, and a few ideas behind a design, the design competition is ready to be formed. The group that went down to Piedras Blancas is currently gathering all data collected to provide the students with a real-life design project. Piedras Blancas is looking forward to the results of the competition, as are we.

Unfortunately it won't be until spring when we award a design winner, but between now and then there is a lot of work that needs to be done. We wish good luck to all students who compete; Piedras Blancas depends on you. CS

Thank you

Without help from several sponsors and local connections, this project would have never gotten to the point it is today. We have several people to thank for being a major part in this project:

Sponsors

Gotitas de Amor, Aerial Media Costa Rica, Ingeotecnia de El General, Ingenieria Satelital, and James Drews with Coldwell Banker Dominical Realty.

Thank you

James Drews – personal friend of Mohammed Haque who has spent considerable time and energy to coordinate this project.
Diego Garcia – INOGO representative and resident of Piedras Blancas. Diego was our Piedras Blancas insider who helped CSWEA gain the support of the locals and bring awareness to the community of our mission.
Mark Green – Peace Corps Volunteer from Rancho Quemado. Mark was our personal translator the entire time we were in Piedras Blancas. Without Mark we would not have been able to talk to the locals, speak with the surveyor, or gather any of the information that was crucial to this project. Mark was our voice and our ears. He gave us a voice during the presentations and gave the locals a voice when expressing their concerns.
Emily Arnold and **Travis Bays** – INOGO representatives who have provided us with many links and introductions to agencies in Costa Rica that can work with us on this mission.

Lastly, a thank you to **CSWEA** and **Eric Lynne** for providing the four individuals mentioned above with the experience to help a community in need of a clean water solution. We hope this is a program that continues for many years and is able to help many villages, like Piedras Blancas.

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2014 Operations Challenge

WEFTEC 2014 and the Operations Challenge (OC) are only a few weeks away but preparations for the OC teams started in early May. This year Central States WEA will put forth two teams; one team with four veterans and one team with four new team members. The two teams are made up of Central States award winners or wastewater professionals from facilities that the award winners are employed. The teams will have practice sessions in late August and early September. Both practices will take place at the Madison Metro Sanitary District Nine Springs Facility, Thank You to Paul Nehm and Montgomery Baker for their continued hospitality and training that the teams will receive. During the first practice team members will gather for the first time and start the process of getting to know each other. One of the goals of this practice is to forge new friendships, find common interests, and build a well-oiled cohesive team. Some of the team members new to the operation challenge have never met, some will have traveled hundreds of miles, but all will bring enthusiasm and a desire to make this a great experience. The first practice is a time to look at the strengths and interests of each person, this helps the coaches in assigning event tasks that need to be divided amongst all team members for the five events. As in past years, the events are: Process Control, Laboratory, Maintenance, Collections, and Safety. During both practice sessions team members will be given practice exams in preparation for the process control exam, they will hone their skills in the laboratory event, build endurance so they can hand cut 8-inch PVC pipe as fast as possible for the collections event, discuss and practice all required tasks for the pump maintenance event, and refine their skills for a confined space rescue in the safety event.

2014 TEAMS MEMBERS:

Pumpers: Captain Joe Rubbelke, Infertech, MN; Todd Sheridan, Northern Moraine WRD; Mike Murphy, Green Bay Metropolitan Sewerage District; Kathy Hammel, Western Lake Superior Sanitary District (WLSSD); and Coach Tom Dickson, City of Oconomowoc, WI.

Shovelers: Captain Chris Kleist, City of Duluth; Brain Skafe, Janesville WWTP; Justin Pratt, City of Moline; Chris Lefebvre, Stevens Point WWTP; Coach Jim Miller, FOTH.

The team members put a lot of time and effort into the practices and training at home for the Operations Challenge and with your support and encouragement the teams will perform as champions. If you are going to be in New Orleans for WEFTEC and you have an opportunity, please help cheer on the CSWEA Operations Challenge teams. CS

CSWEA Welcomes Our New Members

June 2014

- Eric Meester, Foth & Van Dyke
- Patrick Kirsop, WI DNR
- Samantha Austin, Strand Associates
- Louis Sigtermans
- Ryan Hennessy, Microbial Discovery Group
- David Tan, Univ of Minn – Twin Cities
- Anthony Adderley, Minn State Univ – Mankato

July 2014

- Thomas Ludwig, Foth
- Pamela Camejo
- Nora Pederson, HR Green
- Mark Van Weelden, Ruekert-Mielke
- Jose Ramirez, Mikroflot
- Diantha Drown, Univ of Wisconsin – Madison

August 2014

- James Spangenberg, City of Racine
- Ralph Schwarz, City of Racine
- Cate Rahmlow
- Charles Melcher, Veolia
- Brian Katamay, Univ of Illinois - Chicago
- Sarah Walsh
- Mitch Hameister, Drydon Equipment
- Brian Nieckula, US Atlas-Copco
- Amine Dahab
- Charles Bodden

CSWEA Member List current as of August 18, 2014

A Simple Cost-effective Innovation for Water Treatment and Reuse

By Dr. Ying Li

The Water Equipment and Policy Research Center is funding several research projects to create innovative technologies to help water and wastewater treatment facilities meet a growing list of significant challenges:

- Increasingly stringent regulatory requirements.
- Emerging contaminants not yet regulated and being discharged into waterways, and drinking water sources.
- Water scarcity and increasing demands to produce gray water for reuse.

At the University of Wisconsin – Milwaukee (UWM) research scientist Dr. Ying Li's research team is creating novel nanostructured materials and devices that simultaneously remove fine particles, heavy metal ions, TOC, and micro-contaminants in water. They are developing prototypes of a TiO_2/Fe_2O_3 (titanium dioxide/iron oxide) nanofiber membrane and a hybrid $TiO_2/Fe_2O_3/SiO_2$ nano/microfiber membrane.

Increasing regulatory and industry attention is being focused on a variety of unregulated micro-contaminants passing through some water reclamation facilities (WRFs) and accumulating in lakes and streams. Of particular concern are endocrine-disrupting chemicals that can alter the endocrine functions of aquatic life. But they are also a potential threat to humans when they are drawn into drinking water systems and consumed.

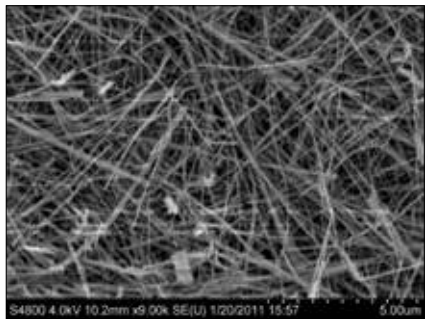
Triclosan (2,4,4' –trichloro-2'-hydroxydiphenyl ether) – an antibacterial and antifungal agent found in many consumer products, including soaps, toothpaste, detergents and toys – is one of the most common micropollutants. A number of studies have indicated a relationship between Triclosan and endocrine disruption, and the development of microbial antibiotic resistance. Unfortunately, WRFs may not have practical cost-effective options to treat for micropollutants, making the widespread adoption of gray water reuse an area of research.

One area of interest is recyclable inorganic adsorbents. TiO_2 has been shown to be an efficient photocatalyst that can help decompose various organic pollutants in photo-irradiation. Integrating TiO_2 and Fe_2O_3 nanofibers results in a unique synergetic effect where enhanced charge transfer occurs at the junctions, resulting in improved photocatalytic activity. The photochemical process activated by the photocatalyst will release reactive radicals that will react with the micropollutants and decompose them.

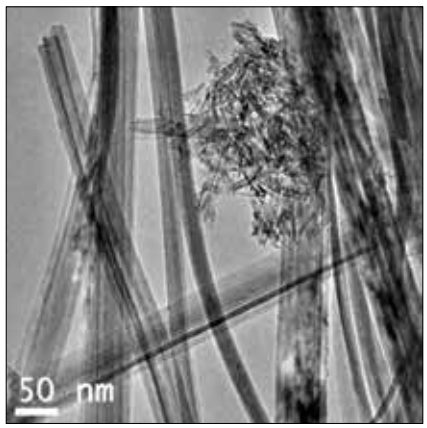
TiO_2 and Fe_2O_3 also adsorb heavy metals. The use of SiO_2 microfibers enhance the mechanical strength of the TiO_2/Fe_2O_3 nanofiber membrane. Dr. Li surrounds a transparent housing with an array of UV lamps, though the system also works with sunlight, which results in savings. One advantage of the system is it allows maximum light illumination on the photocatalyst materials. This is a departure from conventional photocatalytic treatment using TiO_2 nanoparticle suspensions, where the photocatalyst particles themselves become contaminants and also significantly impair light transmission.

Another distinctive feature of the system is that the membrane is anti-fouling. The photocatalytic membrane self cleans because no accumulation of organics on the surface or blocked pores will occur. The TiO_2/Fe_2O_3 materials are inexpensive and easy to fabricate, and sunlight can be used to power the photocatalysis and disinfection processes to save energy.

When completed, Dr. Li's system will perform all the treatment processes; physical filtration of particles, chemical adsorption and photo-degradation of organics and disinfection to inactivate mirco-organisms. It will treat emerging contaminants and micro-pollutants. And it will all happen simultaneously in one simple and inexpensive device.



SEM image of TiO_2 nanowire membrane



HRTEM image of TiO_2 nanowires

Fe_2O_3/TiO_2 hybrid nanowire membrane with different Fe_2O_3 concentration

The Water Equipment and Policy (WEP) Research Center operates under the auspices of the National Science Foundation Industry/University Cooperative Research Center (I/UCRC) Program. WEP is a collaborative nonprofit organization of research universities and

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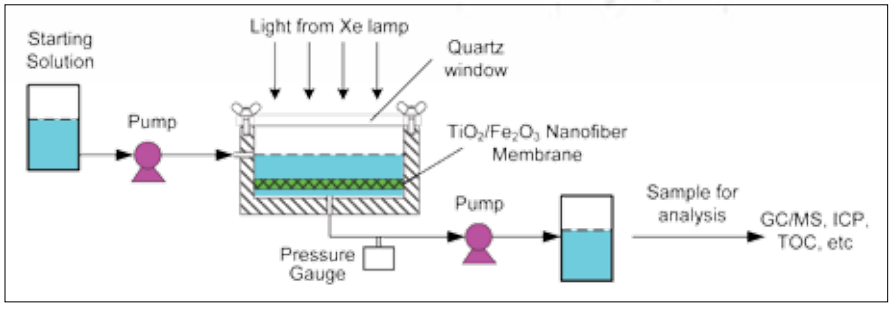
"Dr. Ying Li's research team is creating novel nanostructured materials and devices that simultaneously remove fine particles, heavy metal ions, TOC, and micro-contaminants in water."

members including corporations and government agencies whose annual membership fees fund pre-competitive research in four areas important to the water industry: materials, sensors and devices, systems, and policy. Member organizations benefit in many ways:

- They can receive royalty-free access to intellectual property created from the center's research.
- They stretch their research budgets with significantly reduced rates on scientific research, by pooling research funds with other members, and with access to additional NSF research funds.
- They work with talented engineering students who are potential future employees.

Companies and organizations in the U.S and overseas interested in collaborating on creating the next generation of water technology and products are encouraged to learn more about WEP by emailing Dave Marsh at *marshd@uwm.edu* and visiting *www.uwm.edu/wep/*. CS

Dr. Ying Li



Dr. Ying Li's original design

CSX 2014

By Jim Huchel

The 2014 *Central States Exchange* (CSX) was held on July 17 and 18 at the Kalahari in the Wisconsin Dells, and by all accounts, it was a great success. It was very nice to see many new and old faces in attendance exchanging ideas and suggestions and participating in a wonderful dialogue, and it was a true pleasure to meet with many of our members and their families.

CSX is a forum where members, section chairs, and executive members exchange ideas (on most current best management practices; on the direction of CSWEA). The agenda for this meeting is derived from members and the organization's strategic plan.

Similar to years past, we started by reviewing last year's CSX and the annual conference, and what we had done over the year as it related to the direction taken away from those events. Particular attention was also given to the review of the strategic plan and CSWEA's global initiative.

The Local Arrangements Committee (LAC) reported on what worked and what needs to be improved at the Annual meeting. The Illinois LAC was tasked with developing programs to improve on the ideas brought forth in this meeting will take these ideas and try to improve on them, ideas such as the utility management pricing, ethics training, and the seminars on management skills. These and other ideas will be discussed during the Illinois LAC meetings.

Executive Director, Mohammed Haque, discussed the CSWEA's global initiative to help the community of Piedras Blancas, Costa Rica. Piedras Blancas is a community of roughly 150 homes, all of which are on septic systems with improperly designed drain fields. This inadequate design results in sewage run-off into the streets, storm drains, and the local river. The goal is to help this community find a better way to treat their wastewater from start to finish and then follow up to ensure that the system is working properly. *If you are interested in working on this project, please contact our Executive Director Mohammed Haque.*

Young professional (YP) participation was also a key topic discussed at this year's CSX, as they are the future of this organization. Each section has events or is planning events for YPs. The older (or elder) generation of professionals needs to encourage participation among the younger generation in their organization or geographic area. We also discussed how to improve the Leadership Academy, as it now rotates with the Annual Meeting to allow all of YPs the opportunity to attend, and how to keep our student chapters involved. *If you have any ideas or would like to become more involved, look on the website for your local YP representative.*

The section updates portion allows members for the sections to talk about what they are working on. I have been attending CSX for about seven years, and each year it seems like each section does more and more interesting things.

Wisconsin has strong committees and great leadership.

Minnesota has the Conference on the Environment and is working toward having students work for the national Stockholm Jr. Award.

Illinois has been actively trying to find younger members to run committees, with approximately 75% of the membership currently under the age of 45. They are working to improve relation with local and other associations.

Great work by all of those involved, and if you have a passion check the website, contact the chair, and join a committee.

The last topic of the first day was our strategic planning. Executive Director Haque led the group in reviewing strategic models and determining our customer base, which led into a brainstorming session. This topic was continued the next morning. From there the conversation evolved

into the development of a mission statement. *You haven't lived until you're in a room with 20 environmental professionals working on a mission statement.* It was fun as people would offer their suggestion and the concept would further develop.

WEF and WEFMAX members provided an update on their organizations. A key theme was the importance of communication and the use social media in the future. If you're a techie type person who understands how we can use social media, or if you have an idea regarding the use of technology in our field, please contact Mohammed or me so we can discuss your ideas. I can't promise that we won't volunteer your for a committee, but I can guarantee that we will be there to help in any way that we can. WEF needs your help on their committees, we all have busy lives and little time to do more. However, WEF committees can use any time you can give, so please consider being an active member and joining a committee. CS

"Great work by all of those involved, and if you have a passion check the website, contact the chair, and join a committee."

WLSSD

Western Lake Superior Sanitary District WWTF

The Western Lake Superior Sanitary District (WLSSD) serves 17 communities and four large industrial customers on the western edge of Lake Superior, providing wastewater treatment and solid waste management for 530-square mile region surrounding Duluth, MN.

WLSSD was established in 1971 by an act of the Minnesota Legislature. As a political subdivision of the state of Minnesota, WLSSD provides a single authority to address the regional collection and treatment of wastewater, thereby protecting the St. Louis River basin and Lake Superior. Solid waste authority was added in 1974 and WLSSD has a long history of innovative pollution prevention efforts that draw on the strengths of both its wastewater treatment facility and solid waste management infrastructure.

A MIGHTY RIVER, A GREAT LAKE

WLSSD's story is also the story of the St. Louis River, the second largest of Lake Superior's tributaries and the largest American tributary. The river runs for 179 miles, draining a watershed of nearly 4,000 square miles. The mouth of the river at Lake Superior holds a 12,000-acre freshwater estuary.

For many years, pollution was regarded as the price of progress in America, and that was also true for the communities and industries along the St. Louis River. The river long-supported a variety of industrial activities, including sawmills, paper mills, pulp mills, and steel, tar and chemical production. The Duluth-Superior Harbor was historically home to flour and lumber mills, 50 shipping docks, and numerous active railways. The degradation of the lower reaches of the St. Louis River continued throughout most of the 20th century. The St. Louis Bay of Lake Superior was designated an Area of Concern (AOC) by the International Joint Commission Waster Quality Board in 1973 due to high nutrient, solids and BOD loadings.

A REGIONAL SOLUTION

Construction of the WLSSD WWTF was completed in 1978 and dramatic water

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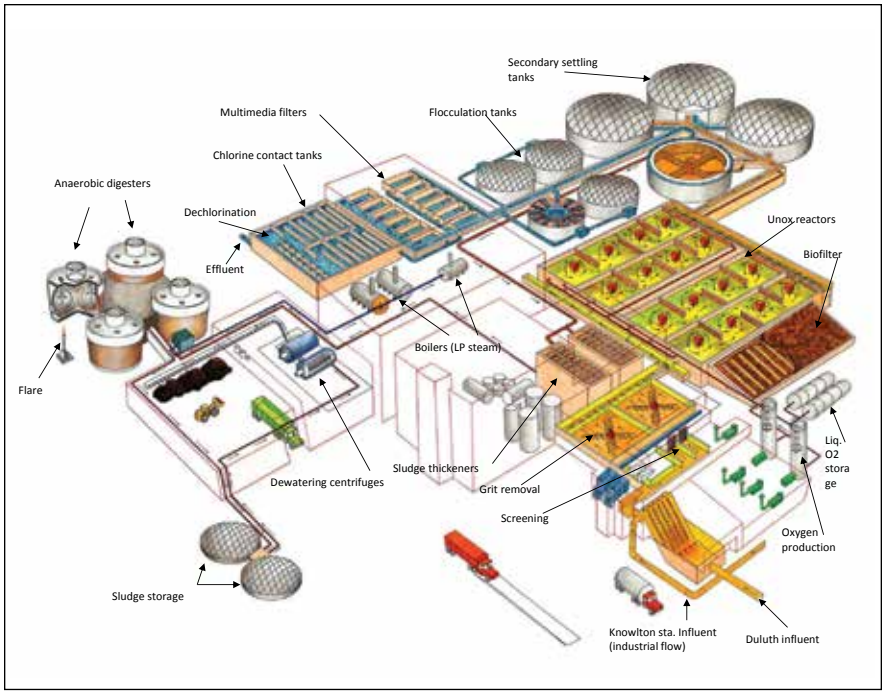
quality improvements in the St. Louis River were apparent within a year of plant operation. The facility is a High Purity Oxygen Activated Sludge system designed to treat 48 MGD of wastewater and is operating currently at an average flow of approximately 40 MGD. The plant has a peak hydraulic capacity of 160 MGD. Approximately 50% of the plant influent flow and load is industrial, primarily from the Kraft pulp and paper industry. The synergistic effect of hot influent with high solids load and low nutrient waste from industrial customers, combined with cold domestic waste with low BOD and high nutrients creates a unique operating environment.

WLSSD's wastewater conveyance system consists of 75 miles of interceptor sewer with seven metering stations and 18 pump stations, the largest of these being the Cloquet Station (36 MGD capacity, 30" forcemain); Scanlon Station (46 MGD, 42" forcemain), and Knowlton Station (49 MGD, 54" forcemain).

PRELIMINARY AND SECONDARY TREATMENT

The facility operates on a 23-acre footprint in the heart of the city of Duluth. As a result of low influent nutrient loading, the plant was designed to operate without primary treatment and is equipped with a Union Carbide Pure Oxygen Activated Sludge (UNOX) system with two 50-ton cryogenic air separation units for onsite production of oxygen to facilitate rapid treatment. The absence of primary treatment also keeps the nutrients in the activated sludge process.

Incoming wastewater is lifted into the plant by five 40-foot long screw pumps, each driven by a 100 horsepower motor. It receives preliminary treatment with mechanically cleaned ¾-inch bar screens and grit tanks to remove debris prior to entering the activated sludge process. WLSSD has recently begun a $10.2 million headworks rehabilitation project that will be completed in 2016; the two course mechanical screens will be replaced by three continuously raked fine screens (1/4") to achieve firm screening capacity (80 MGD each). Dedicated washers and compacters will further improve screenings operation. A full grit tank mechanism replacement and rehabilitation will also include the first US installation of a floating scum screw



conveyor system. WLSSD anticipates the headworks rehab will result in significant improvement in downstream maintenance issues and contribute to a safer work environment as it eliminates manual labor as currently required for scum removal.

Following preliminary treatment, the wastewater enters the oxygenation tanks. Each of the four trains of concrete tanks in the activated sludge process contains four interconnected chambers –each 56 feet square by 18 feet deep (13 feet active). Wastewater is mixed with activated sludge and flows from chamber to chamber as mixers in each chamber dissolve the high purity oxygen into the mixed liquor. The 125 HP first stage mixers were retrofitted with VFDs in 2012 allowing speed control based on dissolved oxygen levels in the first stage reactor. Similarly, in 2010 dissolved oxygen probes were added to the fourth stage chambers to control the oxygen feed. The end result of these two improvements is an automated oxygen flow-control based on the exact amount of oxygen needed, allowing for greater efficiency and minimizing the on-site production of oxygen.

This has been a crucial improvement in lowering energy costs as mixer speeds of 60% are not uncommon. Original plant design allowed for about 160 lbs of BOD/Day/1000 cubic feet of reactor volume. The upgraded mixers are rated at a minimum of 180 lbs/day/1000 ft 3 of reactor volume. Typical low flow operations use two treatment trains with a retention time of 1.4 hours.

Next, wastewater flows into four 2.1 million gallon Temcor dome covered secondary settling tanks for solids removal. The 160 ft. diameter clarifiers contain inboard peripheral launders and a weir system. The mechanimsms of the clarifiers were replaced in 2003.

Water is then distributed to four 1.2 million gallon flocculation tanks. These tanks were originally designed for phosphorus removal, but because WLSSD experiences low influent phosphorus loadings, these tanks are only used to remove small amounts of suspended solids that are discharged from the secondary settling tanks. The mechanisms for the flocculation tanks were replaced and the design changed from radial launders to perimeter launders in 2007.

On average, 9 MGD of activated sludge is returned to the oxygenation tanks and the remainder pumped to dissolved air floatation thickeners for eventual processing into biosolids.

DISINFECTION AND FILTRATION

The plant was originally designed to use a chlorine gas system for disinfection. As a result of safety and security concerns, this was upgraded to sodium hypochlorite in 2006. In 2011 the WLSSD operations team designed and implemented an automated sodium hypochlorite delivery system that is able to respond to the variances in chlorine demand associated with industrial flows and loads. Sodium hypochlorite is delivered by peristaltic pumps into the secondary effluent channel as water flows to one of twelve mixed media filters.

Each mixed media filter bed consists of layers of anthracite coal, sand, and gravel. Water then flows through plant-aerated contact tanks following filtration to remove carbon dioxide and sodium bisulfite is added by peristaltic pumps just before the treated effluent is discharged to the St. Louis Bay to remove any remaining chlorine residual.

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SOLIDS PROCESSING VIA TEMPERATURE-PHASED ANAEROBIC DIGESTION (TPAD)

The plant was originally designed with fluidized bed incineration using refuse-derived fuel (municipal solid waste) to incinerate sewage solids. The system was in operation through the mid-1990s, when aging facilities, uncertainty about future sources of fuel, and increasingly protective regulation for incinerators set in the Great Lakes Initiative spurred the need to develop a new 20-year plan of operation. After extensive review of solids treatment technologies, WLSSD determined that temperature-phased anaerobic digestion offered the best solids management strategy.

Construction of the $33 million TPAD facility was completed in 2001. The original design of the four-tank TPAD system had thickened sludge (5.5 % TS) fed into a single thermophilic tank followed by the mesophilic tanks in parallel. The digesters are continuous feed/continuous mixed and have fixed, submerged covers. With each tank at one million gallons, the overall retention time is typically 26 days. Typical volatile solids reduction results were around 45%.

WLSSD made significant operational changes in the TPAD system in 2010: The thickened sludge is fed into two thermophilic digesters (130 degrees F) in series, followed by the two mesophilic digesters (99 degrees F) that operate in parallel. These changes have led to volatile solids reduction of 50-55%, producing a very stable and low odorant biosolids with very low pathogen values.

The digested sludge is stored in two 450,000-gallon tanks prior to dewatering via one of two Alfa Laval high solids centrifuges, raising the solids concentration from about 3% to 30%. Onsite storage is available for approximately 15 days production of biosolids, with another 30 days of storage available offsite.

WLSSD operates a robust land application program offering Field Green®, a class B biosolids product, to farmers in Minnesota and Wisconsin and for use in mineland reclamation projects on Minnesota's Iron Range. The program land applies an average of 22 dry tons/day on approximately 2000 acres of state-approved application sites. WLSSD operates the largest land application program in the state of Minnesota.

CONSERVING ENERGY, CONTROLLING COSTS

Energy is at the core of WLSSD's greatest past innovations and greatest present challenges. Like all treatment works, WLSSD must remain sensitive to rate increases to reduce impacts on residents and businesses while also contending with shifts in the local paper industry that have resulted in lower flows and lower loads. An Energy Master Plan and Roadmap that outlines near-term and long-term actions throughout the organization to conserve energy and generate energy. The plan will help facilitate a stepwise process towards energy self-sufficiency.

The City of Duluth was named *Outside* magazine's "Best Town in America 2014" for its availability of outdoor recreation resources and natural beauty. WLSSD is proud of our region's incredible natural assets and our social, economic and environmental contributions that enhance our communities and protect our waters. CS

Journeys for Low Phosphorus Compliance

Authors: C.J. Strain, P.E. Blue Water Technologies, Inc. and Rachel M. Lee, P.E. Strand Associates, Inc.

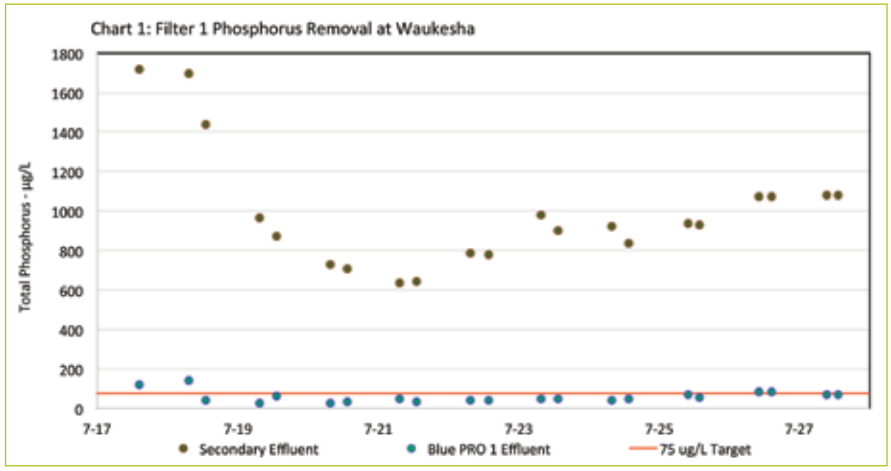
Travelers to the state of Wisconsin will hear a buzz about the environmental impacts of phosphorus discharge. Nearly all residents of Wisconsin, regardless of how remote their town, are aware of the effects of excessive phosphorus in lakes and rivers exhibited by massive algal blooms and closed beaches. In order to protect its rivers and lakes the Wisconsin Department of Natural Resources (WDNR) is in the process of issuing permits in compliance with recent regulation revisions. Surface water criteria or total maximum daily loads (TMDLs) drive these permits levels, and target surface water levels described in the water quality standards range from 5 to 100 µg/L phosphorus (P). These effluent limits compare with the lowest phosphorus discharge levels in the nation. The Fox River has been identified as critically impacted by phosphorus, and dischargers along this river are required to take action to meet strict effluent limits.

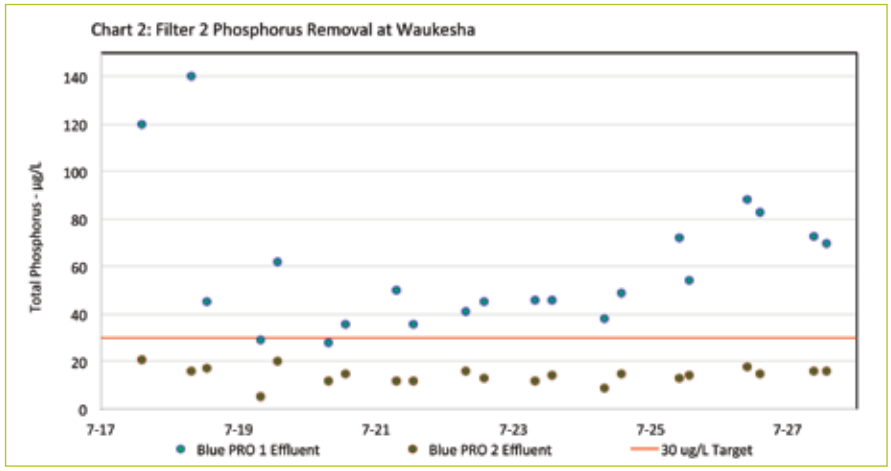
Strand Associates, Inc. (Strand), is working with communities throughout the state to identify and design long-term solutions to the phosphorus issues. The City of Waukesha discharges to the Fox River, and Strand has been engaged by Waukesha to identify long-term solutions to phosphorus challenges through a Study of Feasible Alternatives. Strand has initiated surveys of appropriate phosphorus removal technologies, and has begun pilot testing to evaluate appropriate treatment alternatives.

Blue PRO case studies

There is no reason to reinvent the wheel when several effective wheel designs already exist. It is useful to review technologies that have worked for phosphorus removal around the USA, and ideally learn about the system first-hand by visiting those facilities and speaking with operators. There are several state-of-the-art facilities in operation for ultra-low phosphorus around the country that can

Waukesha BluePRO Pilot Test





provide valuable design information and lessons learned through implementation. During these fall months it would be worthwhile to indulge the urge for the open road and visit these facilities.

The New England region is experiencing many of the same design challenges as Wisconsin with meeting new phosphorus regulations. Numerous phosphorus studies were conducted along the Assabet River in Massachusetts, and several of the facilities were upgraded to meet very stringent TMDLs. The Westerly Wastewater Treatment Plant in Marlborough just outside of Boston was designed to meet phosphorus concentrations of < 70 µg/L with a design flow in excess of 10 MGD. The plant upgrade was designed by CDM SMITH, Inc., and integrated a Blue PRO® adsorptive filter system manufactured by Blue Water Technologies, Inc. With nearly three full years of compliant operation the facility is a resource for effective design, management, and lessons learned.

For the adventurous traveler wishing to see more of the open road, driving the Northwestern USA is an experience anyone would relish. Navigating the state of Idaho takes wayfarers on a journey through mountain timber, deep river valleys, and an abundance of cropland. Running right up against the Nez Perce National Forrest in Idaho, this farmland stretches far and wide. At the Southern end of the panhandle popping up at the edge of the Camas Prairie sits Grangeville, a small town with a proud agricultural history. You would not know it today, but not too long ago Grangeville had a serious problem in common with Wisconsin dischargers.

Westerly WWTP

Being the largest town in Idaho County, Grangeville's population had swelled to greater than 3,100 people as of the 2010 census. Its sewer plant had been in operation since the 1950s, and although it had been through one major upgrade since that time, it needed to meet higher treatment standards. There were two primary challenges, the first being that the phosphorus regulations were getting significantly more stringent. The second was that the site has a boat clarifier followed by chlorine disinfection contact tanks that fill up with solids. The phosphorus permit was considered the biggest problem. The new permit given to the facility was a seasonal summer limit for just a few months a year, but the permit limited discharged phosphorus to < 67 µg/L TP.

JUB Engineers, Inc., took charge on behalf of Grangeville. The goal was to provide the most reliable treatment system while minimizing the capital and life-cycle costs to the rate payers. After creating a short list, the most promising technology piloted was the Blue PRO® adsorptive filter process. This tertiary filtration process achieved the phosphorus permit levels while at the same time polishing the secondary clarifier's TSS thereby eliminating solids buildup in the chlorine contact tanks. The adsorptive filter process was ultimately installed for treating Grangeville's wastewater since it addressed the functional treatment requirements.

The adsorptive filters allowed Grangeville an end-of-pipe solution that would not require significant changes to the existing plant, which was a concern to the town. No other chemical dosing or phosphorus removal equipment was desired through secondary treatment, and the Blue PRO® filters reduced the phosphorus from normal secondary

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effluent levels of 2 to 5 mg/L to the required limit. Following commissioning of this system not only was the chlorine contact tank cleaner due to reduced solids, but the chlorine usage was reduced along with some undesirable byproducts. Even though phosphorus removal is only needed a few months a year, the filters are maintained in operation the remainder of the year to remove the solids.

Waukesha pilot testing

Strand has had the opportunity to apply the experience of these successful sites to the challenges at home in Wisconsin. Blue Water Technologies was engaged to complete a pilot study at the City of Waukesha Wastewater Treatment Plant (WWTP). The goal was to remove phosphorus to proposed permit levels and analyze the lifecycle costs of the technology in preparation for compliance with new permit limits. A pilot adsorptive filtration system emulating those installed in Marlborough, Massachusetts, and Grangeville, Idaho, was brought to the site for demonstration purposes.

Field analytical data from the pilot at Waukesha is plotted in Figures 1 and 2. Figure 1 represents the results that would be achieved with a single filter train, similar to the Marlborough Westerly facility. Figure 1 shows that a single-filter train is capable of meeting $<$ 75 μg/L of total phosphorus. Figure 2, which represents a two-stage Blue PRO® adsorptive filter system, shows what the system can achieve beyond the typical 75 μg/L of total phosphorus limit. The two-stage adsorptive filter maintained $<$ 30 μg/L during the pilot, thereby achieving the 40 μg/L limit that many lake dischargers will have to meet.

During the pilot other observations were made. Figure 1 shows how dependent the single-filter train is on the influent water quality. As the plant modified ferric chloride feed to decrease secondary effluent phosphorus concentration, the BluePRO® filters showed even lower effluent phosphorus concentrations. These filters can polish to reuse quality, which provides more flexibility for ultimate water discharge or use. Although nitrogen is less of a regional concern, the surface area and detention time of these adsorptive filters have been used in several examples throughout the USA for biological denitrification without detrimental impacts to the phosphorus adsorption efficiencies.

The Study of Feasible Alternatives is in its initial stages, so no analysis about how the Blue PRO® filters compare to other alternatives can be made at this time. Blue PRO® is a proven technology that can meet the low effluent limits Waukesha is facing. This was clearly demonstrated during the pilot test. The equipment is simpler than some other tertiary treatment technologies like membranes which is always an advantage for operations staff.

Ultimately the equipment selection will be based on cost and capability. The list of technologies that can reliably meet the proposed phosphorus regulations is short. Waukesha will use the valuable information gathered during pilot testing as they work towards a plan for the future.

Grangeville WWTP

STUDENT DESIGN COMPETITION PAPER

Providing Sanitation in Peri-Urban Slums of Nairobi, Kenya

Lance M. Langer, Rahul Gogia, Amanda Caldwell-Jacques, Reggie Jansen, Bill Cheng
WEF-AWWA Joint Student Chapter Design Team
University of Illinois – Urbana/Champaign

The WEF UIUC design team investigated the process of anaerobic digestion and the types of reactors that could perform this process in Nairobi, Kenya. The design project was inspired by the Sanergy mission to provide sanitation to the slums of Nairobi. Sanergy is slowly cleaning up each community through constructing and setting up outhouses which they call "Fresh-Life Toilets." They are able to use the waste collected by these toilets to produce fertilizer which they are able to sell back to East African farmers for profit. However, this profit is not enough to continue to efficiently grow and expand their operation. Through providing a sanitation infrastructure for the community, fewer pollutants are introduced into the water network and fewer people are becoming ill as a result. Our mission through this design project was to provide a feasible alternative to composting and establish a new source of income for Sanergy through the sale of the biogas that could be generated by the newly proposed anaerobic digesters. Our designs are unique to the community because they are fairly cheap, easy to operate, maintain, and understand.

Anaerobic digestion is a process for which organic matter is converted to methane and carbon dioxide in the absence of oxygen. In proposing feasible designs for anaerobic digesters the team determined that the key design challenges would include space and operation limitations, shortage of materials and funding, lack of expertise and volume of incoming waste. After considering these challenges and limitations, it was decided that design goals would be to keep costs at a minimum while providing a simple operation and maintenance plan. Two different digesters, wet and dry, which took the form of two different reactor types, Continuously Stirred Tank Reactor (CSTR) and Plug Flow Reactor (PFR), were investigated.

The wet anaerobic digesters are continuously stirred tank reactors (CSTR) with proposed 10% total solids content. With three metric tonnes of waste being produced per day at 30% total solids content, the diluted influent would be around nine metric tonnes per day (9 m^3/day). It is assumed that the solids retention time (SRT) would be 30 days bringing the total required internal volume to 270 cubic meters. At this size, having just one reactor that could handle this volume would be difficult to build and maintain, thus the team spread this volume out among three reactors. Each reactor is designed to be about three meters in height, half below ground and half above, and three and a half meters in radius, all constructed out of reinforced concrete. With these dimensions, each reactor would contain a total of 115 cubic meters of storage volume providing a factor of safety of 1.28.

This design will operate on the principle of conservation of mass. With an influent chute a meter above ground, and an effluent discharge one half meter above ground regulated by a plug valve, the goal is to use this principle to keep the reactors closed to the atmosphere and utilize the property that gas rises, in order to collect the gas production at an intake at the top of the dome. The gas will travel up and through a hose, regulated by a check valve, which will be connected to the top of the dome. Each reactor will be equipped with four long plastic oars, evenly spaced from each other and connected at the dome, which will be used to manually stir the contents of the reactors.

The team determined that it would not be necessary to provide heating to our digesters, as conventional digesters need, because Nairobi is located right below the equator. With this in mind, the team theorizes that the digester and the influent will naturally receive enough heat from the sun to achieve mesophilic temperatures.

The dry anaerobic digester is a plug flow reactor (PFR) with proposed 30% total solids content. With three metric tonnes of waste being produced per day at 30% total solids content, the influent would be around three metric tonnes per day (3 m^3/day). Again assuming that the SRT would be 30 days, the total required internal volume is 90 cubic meters. Applying a 5:1 length to width ratio, the length should be 20 meters and the width to be four meters while providing a height of one and a half meters, all above ground and constructed with reinforced concrete. With these dimensions, the reactor would contain a total of 120 cubic meters of storage volume providing a factor of safety of 1.33.

This design would utilize a 20-meter long stainless steel auger that would move the influent through the length of the reactor in a plug flow fashion. The auger would be mounted at both ends and would be equipped with a hand crank which would be manually cranked from both ends in unison. A similar convention for influent addition and effluent removal will be applied to this reactor. The influent chute will be one meter above ground at one end of the reactor while the effluent discharge, regulated by a plug valve, a half a meter above ground will be located at the other end. The exact same method for gas collection and heating that was used for the wet anaerobic digester will be used for this digester.

The choice of the reactor configuration had a significant impact on determining

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biogas production. For the CSTR, assumptions made include ideal mixing occurring with minimal concentration gradients inside the reactor volume. For this to be reasonable, the reactor contents must be mixed thoroughly in regular intervals, as the biomass will aggregate and settle to the bottom of the tank as it is processed. The first step in determining gas production was determining the solids retention time (SRT), which is the optimal retention time for biomass digestion. For many systems, it can be difficult to decouple the solids retention time from the hydraulic retention time (HRT), especially if the stream is high in solids content and/or there is a recycle stream present. However, since this is not the case with the current design, the SRT can be set equal to the HRT.

The first of the methods used to calculate biogas production was the empirical method developed by Metcalf & Eddy (2003), in which the volatile suspended solids (VSS) reduction is calculated as a function of the SRT. The empirical equation used assumes no characteristics about the waste being used, and as such provides more of a ballpark estimate of the biogas production. The VSS reduction was calculated and used to determine the VSS removed from the total VSS in the feed stream. Finally, biogas production was calculated from dimensional analysis with the total VSS removed and common design criteria. The biogas production was estimated to be 111-165 m^3/day. When the biogas is assumed to be composed of approximately 60% methane, the methane production is 66-99 m^3/day.

A more accurate method of determining biogas and methane production was by taking into account the waste characteristics. Using the empirical equation developed by Chen & Hashimoto (1978) the overall methane and biogas production were determined to be 77 and 128 m^3/day, respectively.

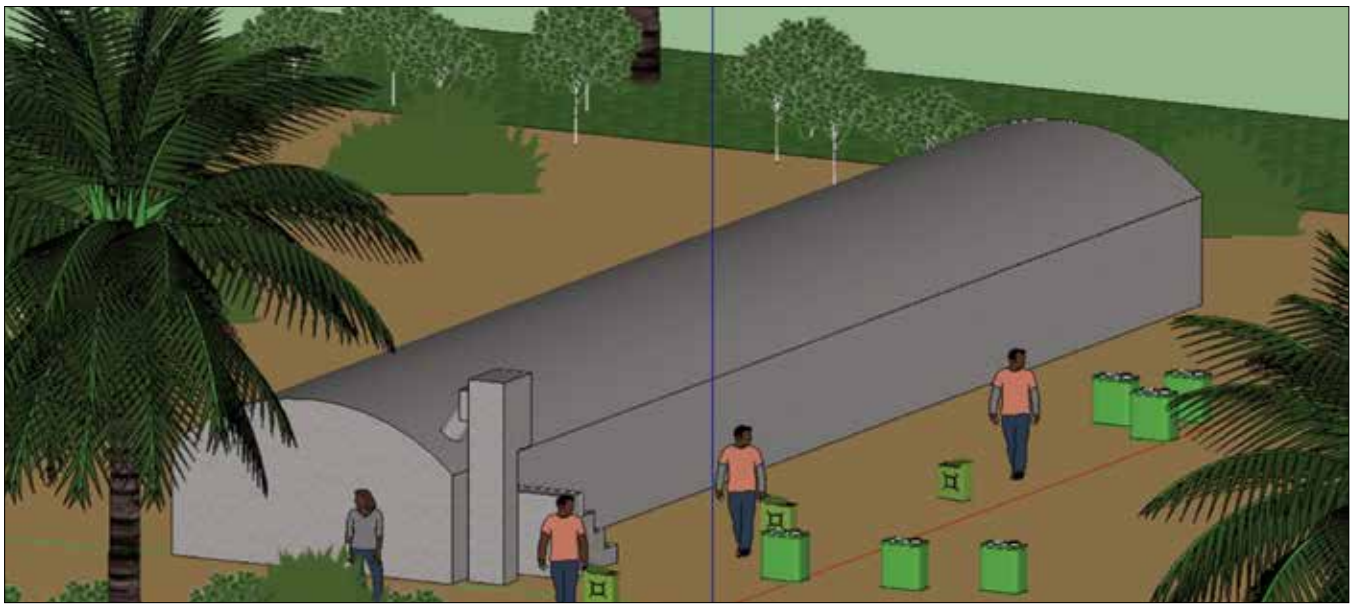
The costs for the two alternatives were estimated to be as follows:

CSTR Cost Analysis

Item	Quantity	Units	Cost/Item	Total Cost
Check Valve	3	UNIT	$ 54.23	$ 162.69
Plug Valve	3	UNIT	$ 54.51	$ 163.53
Wall Concrete	87.39	CUB MET	$ 138.64	$ 12,115.75
Base Concrete	136.8	SQ MET	$ 20.80	$ 2,845.44
Steel Bar Reinforcement	4,828	KG	$ 1.59	$ 7,676.63
Extra Base Thickness	6.15	PER 150 MM	$ 18.18	$ 111.81
Ladders	3	UNIT	$ 49.99	$ 149.97
Plastic Oar	12	UNIT	$ 19.99	$ 239.88
Excavation	267.72	CUB MET	$ 2.84	$ 760.33
Spread Dirt On Site	267.72	CUB MET	$ 1.70	$ 455.12
			Total	**$ 24,681.15**

PFR Cost Analysis

Item	Quantity	Units	Cost/Item	Total Cost
Check Valve	1	UNIT	$ 54.23	$ 54.23
Plug Valve	1	UNIT	$ 54.51	$ 54.51
Wall Concrete	39.54	CUB MET	$ 170.45	$ 6,739.59
Base Concrete	96.22	SQ MET	$ 25.57	$ 2,460.35
Extra Base Thickness	2.05	PER 150 MM	$ 18.18	$ 37.27
Steel Bar Reinforcement	6,367	KG	$ 1.59	$ 10,124.92
Stainless Steel Auger	1	UNIT	$ -	$ -
			Total	**$ 19,470.87**



Using our calculations for biogas production, we were able to come up with project payback periods for both designs. According to Charles Banks, a speaker at the University of Southampton, every m^3 of biogas produced can be expected to yield 10 kWh. For our project, we scaled this down to 2 kWh to factor in ideal yield, inefficiencies, malfunctions and methane concentration. With our range of 110-165 m^3 of biogas per day, we were able to come up with a range of 88,000 to 130,000 kWh/year of energy production in our digesters. The current rate for commercial electricity in Kenya is $0.18 (16 Kenyan Shillings). We applied this going rate to estimate anywhere from $15,600 to $23,200 of return value per year if Sanergy were to decide and invest in a combustion engine and generator. In covering the costs of the digester construction, these biogas yields would produce payback periods of less than two years.

Our team took into account a number of factors when considering which recommendation to make

	Metcalf/Eddy Method		Metcalf/Eddy Method		Chen/Hashimoto Method	
	Amount	Units	Amount	Units	Amount	Units
Design Criteria	1.12 m^3 of biogas/kg VSS		0.75 m^3 of biogas/kg VSS		N/A	
Biogas Production	165	m^3	111	m^3	128	m^3
kWh/day	353	kWh/day	238	kWh/day	274	kWh/day
kWh/year	128,882	kWh/year	86,702	kWh/year	99,981	kWh/year
Return value/year	$ 23,198.67		$ 15,606.38		$ 17,996.54	
Wet Digester Cost	$ 24,681.15		$ 24,681.15		$ 24,681.15	
Payback period	1.06	Years	1.58	Years	1.37	Years
Dry Digester Cost	$ 19,470.87		$ 19,470.87		$ 19,470.87	
Payback period	**.84**	**Years**	**1.25**	**Years**	**1.08**	**Years**

to Sanergy. Cost, performance, maintenance, and practicality all played a part in our decision. After weighing different options, our team recommends Sanergy use the Wet Anaerobic Digester design because it is economically viable, practical and a proven technology. With three smaller digesters as opposed to the Dry design's singular tank, it allows for continued use in case of a malfunction or maintenance issue. Its two-year payback period is a realistic length for Sanergy to have to wait before turning a profit. Most importantly, wet anaerobic digesters are used all over the world and have been a proven energy-producing technology for decades, so issues with maintenance and future upgrades will be simplified and minimal.

The main reason our team did not further pursue the dry digester option was due to the need for a stainless steel auger and the complications that would arise during construction. Because of the high solids content in the dry digester, a strong material was needed for mixing. When looking at similar models, it was consistently found that augers were used to mix the waste, and we initially chose this as our design point. However, Sanergy does not employ anyone who is licensed to work with stainless steel. In order to install the auger, Sanergy would have to either train an existing employee or bring in someone outside of the company to make the design work. The team decided that both of these options were too costly and inconvenient, especially when considering that in addition to cost, the dry digester did not have any significant advantages over the wet design.

Hopefully with our detailed design and research, we can begin to build towards a better future for the residents of Nairobi, Kenya. Our model, if expanded upon and further developed, has the potential to become widespread throughout developing nations in need of proper sanitation systems. If Sanergy does indeed move forward with our design, it could be a pivotal moment for the community and the wastewater industry as a whole. CS

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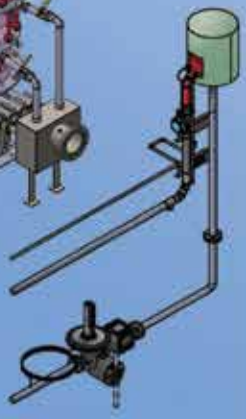

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CALL FOR ABSTRACTS

88th ANNUAL MEETING

This is a request for abstracts of papers to be considered for presentation at the 88th Annual Meeting of the Central States Water Environment Association, Inc., which will be held May 18-21, 2015 at Drury Lane, Oak Brook Terrace, Illinois. To receive consideration, abstracts with the Abstract Information Sheet must be submitted to the Technical Program Committee **before Wednesday November 26, 2014.**

By popular demand, the fourth track will be continued in 2015!

This fourth track will consist of operations and utility management topics. Papers on troubleshooting, optimization studies, case studies, completed projects are of high interest.

This year's conference will also feature sessions on soft skills/leadership to provide options for attendees looking to hone their interpersonal, management and communication skills.

Two hours of ethics training, as required by WI and MN Professional Engineer Certification Requirement, will be added to the program as well for those engineers that require this to maintain their license.

Other topics that are of high interest are technology related papers. Papers on other subjects which you feel may be of interest to members are, of course, also welcome. All written papers submitted are eligible for the Radebaugh Award.

OPERATIONS and MAINTENANCE:

- Resource Recovery – Nutrients and Energy
- 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

ENERGY PRODUCTION, RECOVERY and EFFICIENCY:

- Digester Gas Technologies
- Co-digestion
- Heat Recovery Technologies
- Efficiency (pumps, motors, lights, UV disinfection, HVAC, etc.)

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 and Combined Sewer Overflow Management

RESEARCH and 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 and Regulatory Issues

RESIDUALS, SOLIDS and BIOSOLIDS:

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

CALL FOR ABSTRACTS

WATERSHEDS:
- Anti-Degradation Issues
- Habitat or Groundwater Protection or Restoration
- Non-Point Pollution Sources and Management
- Water Quality/Watershed Management Issues and Initiatives

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

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 Handbooks and Policies Violate Labor Law?
- Management Rights for Managers
- Social Media and the Workplace

ABSTRACT INFORMATION SHEET

2015 ANNUAL MEETING | Central States Water Environment Association | May 18-21, 2015 | Drury Lane, Oak Brook Terrace, IL

Paper Title: _____

Author(s), title, affiliation, & address: (underline person presenting paper): _____

_____

_____ Email Address: _____

Are you involved in utility operations? ☐ Yes ☐ No Are you a Young Profession (under 35 years of age) ? ☐ Yes ☐ No

Please note the session(s) that are the best match for your proposed talk:

☐ Operations and Maintenance ☐ Utility Management ☐ Technology (IT/SCADA/Process Control/etc)
☐ Collection System ☐ Research and Design ☐ Energy Production, Recovery and Efficiency
☐ Residuals, Solids and Biosolids ☐ Watersheds ☐ Other (please describe) _____

Will this or similar work have been presented or published elsewhere by the time the Annual Meeting is held? ☐ Yes ☐ No

If yes, where? _____

An electronic copy of the abstract should be forwarded to:
Derek Wold, Chair, Technical Program Committee, Baxter and Woodman, Inc., 8840 West 192nd Street, Mokena, IL 60448
Telephone: (815) 459-1260 E-mail: *dwold@baxterwoodman.com*

For the use of the Technical Program Committee:	**Rating***	**Remarks**
1. Originality & Status of Subject	_____	_____
2. Technical Content	_____	_____
3. Water Environment Significance	_____	_____
4. Adequacy of Abstract Preparation	_____	_____
Total Points	_____	_____

***** 5 = Excellent, 4 = Good, 3 = Average, 2 = Fair, 1 = Poor **Please note, Abstracts are due before November 26, 2014.**

To receive consideration, please submit a copy of your abstract via email to the Technical Program Committee, care of Derek Wold, to the email address below. PDF files are greatly preferred, but not required. Word processing files must be PC, MS-Word 2007 compatible. The Abstract Information Sheet and submission instructions are available at *www.CSWEA.org*, or please contact me via email and I can forward it to you. Thank you.

Derek Wold
Chair, Technical Program Committee
Baxter and Woodman, Inc.
8840 West 192nd Street, Mokena, IL 60448
Phone: 815-459-1260
Email: dwold@baxterwoodman.com

INSTRUCTIONS FOR THE SUBMISSION OF ABSTRACTS &CRITERIA FOR PAPER SELECTION

The Central States Water Environment Association (CSWEA) Technical program Committee has the responsibility for technical sessions at the Annual Meeting. Participants in any sector of the water environment field are cordially invited to submit abstracts for evaluation. The basis for selection will be the excellence of the abstracts as judged by the committee.

The abstract should be submitted to the technical program chair whose contact information is shown on the abstract information sheet. In order for an abstract to be considered by the Technical Program Committee, the abstract information sheet, which serves as the cover page of the abstract, must be included with each abstract. Abstracts should *summarize* the talk in about 250 words and must be less than one page single-spaced, or two pages double-spaced using standard fonts and margins (about 500 words). The total number of abstract pages, including all tables and figures, must not exceed six (6) pages. Papers provided at presentations should be longer provided that the oral presentation fits into the timeframe allotted after allowing time for questions.

The presenting author of each abstract will be notified in February of the acceptance or rejection of the abstract.

The following should serve as a guide in the preparation of the abstract and will serve as a guide for the reviewers of the abstracts.

Originality and status of subject: The paper should deal with new concepts or with new and novel applications of established concepts. It also may describe substantial improvements of existing theories or present significant data in support or extension of those theories. Studies of incomplete or ill-defined problem situations should be avoided. Previously published data should be introduced only in summary form and for comparative or supportive purposes.

Technical content: A summary of the conditions under which data were obtained should be presented along with the methodology used. The conclusions should be presented in the abstract and should follow directly from the investigation or evaluation that was conducted.

The abstract should substantiate that the project has been fully developed, that the theory or experimental procedure has been firmly established, and that data have been collected and subjected to analysis. It should be evident that the abstract clearly describes the entire content of the conclusions of the paper to be presented.

Water environment significance: The paper should relate clearly and significantly to the water environment field. Papers of a truly fundamental scientific nature are desired, but the author should make evident the relationships of the work to a practical problem area or situation in water quality and wastewater control.

Adequacy of abstract preparation: The committee has noted that historically the adequacy of an abstract is often indicative of the quality of the final paper. As a result, authors are urged to prepare their abstracts with care, following the instructions noted above. As a reminder, an abstract is meant to summarize the presentation. The summary should include objectives, scope, and general procedures, insofar as the limited length of the abstract permits. An indication of results or conclusions is required.

CSWEA/IWEA
19th Annual WEFTEC Reception

Please join CSWEA and IWEA as we welcome members and friends to kick off another great WEFTEC. All members and supporters of CSWEA and IWEA are invited to attend.

HILTON NEW ORLEANS RIVERSIDE
SUNDAY SEPTEMBER 28, 2014
5:30 p.m. to 8:00 p.m.

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CSWEA Wisconsin Section YP Brewer Outing.

Submit for an Award – 2015 WEF and CSWEA

By Keith Haas and Patricia Oates

Our role in protecting the public and the environment are often undervalued and invisible to the very public that we protect. Whether in design, academia, equipment manufacture and supply, management, or operations, we all know individuals who have successfully addressed unique and challenging issues. Our awards program offers the opportunity to receive recognition for these deserving professionals.

A top priority of CSWEA each year is to recognize the efforts of our members and water and wastewater professionals at all levels. We also seek to provide top-quality nominees to the Water Environment Federation (WEF) each year for national level recognition. Sadly, in some years, many awards have few or no nominations, resulting in missed opportunities to provide recognition to deserving water quality professionals. It's time to brag a little bit about the accomplishments of our members. To nominate someone is easy and takes five minutes – send the person the nomination form, and when they completed, you can submit it to CSWEA.

In order for you or a deserving colleague to be recognized, please submit a nomination to the Central States Water Environment Association and/or WEF for one of the many awards available.

Below is a listing of the award opportunities. Please carefully review the various awards available and nominate one of our many deserving members.

Please note that award submittals need to be made by November 14, 2014 for Awards presented by CSWEA to allow distribution to the respective CSWEA or WEF Awards Committees for consideration. CSWEA will present the winners with their awards at the 88th Annual Meeting Awards Banquet in May 2015, Drury Lane in Oakbrook Terrace, IL. WEF awards will be presented at WEFTEC 2015 in Chicago.

2015 CSWEA & WEF Award nominations now being accepted

Nominations are now being accepted for the following WEF awards and should you be aware of a worthy nominee we ask that you please complete and return the bottom portion of this page for consideration. Note that it is OK to self nominate. Each award is briefly described below and complete information may be found on the *www.CSWEA.org* or *www.WEF.org* websites.

WEF AWARDS presented at WEFTEC

Charles Alvin Emerson Medal: This award is presented by WEF to an individual whose contributions to the wastewater collection and treatment industry most deserve recognition. Areas of involvement include membership growth, water resource protection, improved techniques of wastewater treatment and fundamental research.

Harry E. Schlenz Medal: This award is presented by WEF and recognizes the achievements of an individual *outside* of the water environment profession, who takes up the banner of environmental public education. This person is typically in the journalism, film or video production field.

Richard S. Englebrecht International Activities Service Award: This award is presented by WEF and recognizes sustained and significant contributions to the furtherance and improvement of the activities of the Water Environment Federation in the international field.

Outstanding Achievement in Water Quality Improvement Award: This award is presented by WEF and CSWEA to the water quality improvement program that best demonstrates significant, lasting and measurable excellence in water quality improvement or in prevention of water quality degradation in a region, basin or water body.

Gordon Maskew Fair Medal: This award is presented by WEF and recognizes worthy accomplishments in the training and development of future sanitary engineers. Nominee must be a WEF member.

Public Education Awards: There are three categories of Public Education Awards: **Individual, Member Association and Other**. The awards are presented by WEF and recognize significant accomplishments in promoting awareness and understanding of water environment issues among the general public, through the development and implementation of public education programs.

George Bradley Gascoigne Medal: This award is presented by WEF to the author(s) of an article, which presents the solution of an important and complicated operational problem within a full-scale, operating wastewater treatment plant, which is appropriately staffed. Article must have been published in a federation or member association magazine/newsletter during the previous year.

Thomas R. Camp Medal: This award is presented by WEF to a member who demonstrates a unique application of basic research or fundamental principles through the design or development of a wastewater collection or treatment system.

The Phillip F. Morgan Medal: The Morgan Medal is awarded by WEF and recognizes valuable contribution to the in-plant study and solution of an operational problem. A published paper is not required.

The George J. Schroepfer Medal: The Schroepfer Medal is awarded by WEF and recognizes a professional engineer for conceiving and directing the design of a project to achieve substantial cost savings or economic benefit over other alternatives, while achieving environmental objectives.

Member Association Safety Award: This WEF award is presented to a member association to recognize the success of the safety programs in their local wastewater works.

WEF AWARDS presented at CSWEA Awards Banquet

Arthur Sidney Bedell Award: The Bedell is a Federation award that is given annually to one recipient in recognition of outstanding achievement in the sewerage and wastewater treatment works field, as related particularly to the problems and activities of the Member Association. The Bedell award subcommittee selects the nominations, and the award is presented at the CSWEA Annual Meeting.

William D. Hatfield Award: The Hatfield Award is a Federation award given annually to one recipient in recognition of outstanding operation of a wastewater treatment plant. Each State Section may nominate one person per year and submit it to the Hatfield subcommittee. This award is presented at the CSWEA Annual Meeting.

George W. Burke Safety Award: The Burke Award is made annually by WEF to a municipal or industrial wastewater facility for promoting an active and effective safety program. Each State Section Committee can nominate a facility and the nominations are then sent to the general awards committee. The winner will be presented with the Burke Safety Award at the CSWEA Annual Meeting.

Lab Analyst Excellence Award: This is a WEF award that is given annually to one recipient in recognition of outstanding achievement in the area of water quality analysis. Each State Section Laboratory Committee may nominate one person. This award is presented at the CSWEA Annual Meeting.

CSWEA AWARDS presented at CSWEA Awards Banquet

Radebaugh Award: The Radebaugh Award is given to the author of a deserving paper presented at the previous year's annual meeting. The Radebaugh award subcommittee selects the winner from nominations received and the award is presented at the CSWEA Annual Meeting.

Operations Award: The Operations Award is a Central States award that is given annually to one recipient in each state. The purpose of this award is to recognize operators of wastewater treatment facilities who are performing their duties in and outstanding manner and our demonstrating distinguished professionalism. The States Sections' Committee makes the selection and each State Section winner will receive the award at the CSWEA Annual Meeting.

Industrial Environmental Achievement Award: The award is given at the CSWEA Annual Meeting to one industry per year in recognition of outstanding contributions in waste minimization, pollution prevention, environmental compliance and environmental stewardship. Each State Section Industrial Committee may nominate one facility per year.

Bill Boyle Educator of the Year Award: This award is given to one teacher per year in recognition of outstanding education assistance to students of any level in the study of the water environment. The award is presented at the CSWEA Annual Meeting.

Collection System Award: This award is given annually to one member from each section in recognition of outstanding contributions in advancing collection system knowledge and direct or indirect improvement in water quality. Each State Section Collection System Committee can nominate one individual per year with the selected candidate receiving the award at the CSWEA Annual Meeting. The recipient of the Association Award shall be

nominated annually for the WEF Collection System Award.

CSWEA Outstanding Young Professional Award: This award recognizes the contributions of young water environment professionals for significant contributions to CSWEA and to the wastewater collection and treatment industry at the CSWEA Annual Meeting.

Academic Excellence Award: The Academic Excellence Award is given to one student per year from each eligible institution in the state section hosting the Annual Conference. (Illinois is hosting the next conference.) An eligible institution shall be a college or university having a recognized graduate or undergraduate program in engineering as accredited by the Accreditation Board for Engineering and Technology. The candidate shall be selected by the Department Chairman or other designated person at the eligible institution. Selected candidates are able to attend the CSWEA Annual Meeting with expenses paid, to receive their award and scholarship.

Central State Section Safety Award: The CSWEA Facility Safety Award is made annually by CSWEA to a municipal or industrial wastewater facility within each State Section in recognition of active and effective safety programs from Burke Award submissions and the awards are presented at the CSWEA Annual Meeting.

To submit nominations for any award, please fill out a form online at ***www.cswea.org/awards*** or complete and submit the following information to Keith Haas by e-mail (preferred choice), or regular mail to:
Keith Haas, Racine Wastewater Utility, 800 Center Street, Room 227, Racine, WI 53403
Phone: 262-636-9434 E-mail: *keith.haas@cityofracine.org*

Nominations must be received no later than November 14, 2014 for consideration.

Award Name: _____

Nominee: _____

Nominee Contact Information (include as much info as possible):

Employer Name: _____

Phone #: _____

Email address: _____

WEF member ID _____

Other: _____

Please provide a brief description of your nominee's qualifications for the award:

_____

_____

Your name: _____
(it's OK to nominate yourself!)

Your Contact Information:

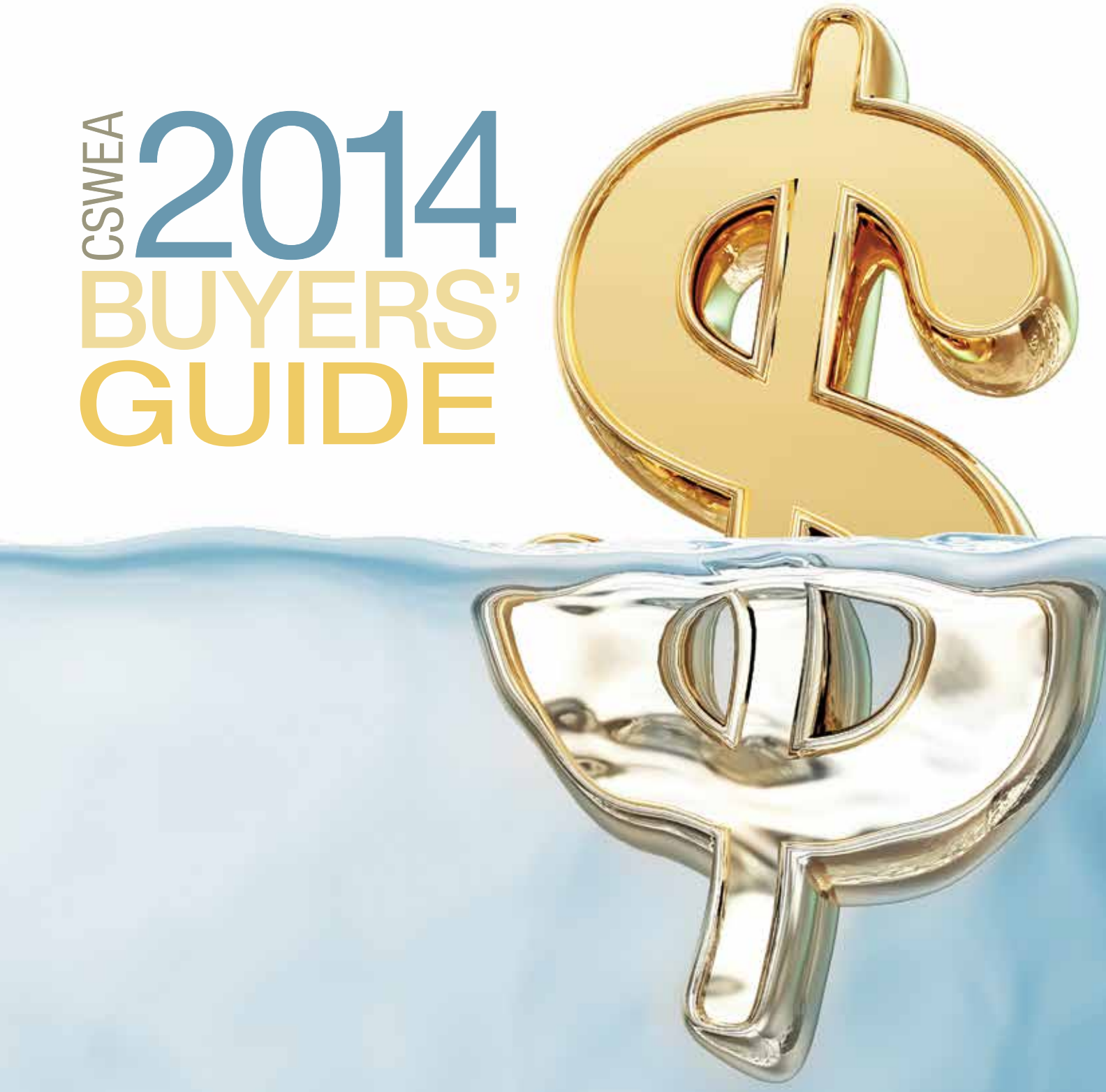
Phone # _____

Email address _____

Other: _____

Additional information on these awards is located at *www.CSWEA.org*, *www.WEF.org*, or by contacting Mohammed Haque, *855.692.7932 x101*, *mhaque@cswea.org*, Keith Haas, 262.636.9181, *keith.haas@cityofracine.org*, or Patricia Oates, *651-602-4911*, *patricia.oates@metc.state.mn.us*

CSWEA 2014 BUYERS' GUIDE



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Welcome to the annual ***Central States Water*** Buyers' Guide. When making purchasing decisions about products and services in the wastewater industry throughout the Central States region, please support the companies whose advertising makes ***Central States Water*** possible.

OUR CSWEA BUYERS' GUIDE CONSISTS OF TWO SECTIONS:

1. A **categorical listing** of products and services, including a list of companies which provide them.
2. An **alphabetical listing** of the companies appearing in the first section. This listing includes name, contact info, website, and more.

LISTINGS BY CATEGORY

Activated Carbon
CEI Carbon Enterprises Inc.

Biogas to Energy
Unison Solutions

Blower Repair & Sales
Berryman

Chemical Processing & Feed Systems
Crane Engineering
Donohue & Associates, Inc.
Energenecs
Force Flow
LAI Ltd.
Pollard Water

Coatings, Lining & Corrosion Control
American Cast Iron Pipe Co.
Dixon Engineering
Raven Lining Systems
SpectraShield Liner Systems

Construction Castings
HD Supply Waterworks

Continuing Education
University of Wisconsin-Madison

Contractors
Process Equipment Repair Services

CSO/SSO Controls, Water Resources, Distribution & Collection
ADS
Arcadis
Brown and Caldwell
CDM
Clark Dietz
Donohue & Associates, Inc.
Hydro International
Strand Associates, Inc.
Trotter
Veolia

Dechlorination
Pollard Water

Diffused Aeration Systems
Sanitaire

Digester Gas Safety Equipment
Shand & Jurs

Disinfection
Evoqua

Electrical, Instrumentation/ Controls/Generators
Baxter & Woodman, Inc.
Berryman
Brown and Caldwell
CDM
Clark Dietz
Donohue & Associates, Inc.
Energenecs
Inland Power Group
Pollard Water
Smith & Loveless
Strand Associates Inc.
Xylem

Employee Monitoring Systems
Shand & Jurs

Engineers/Consultants
Advanced Engineering and Environmental Services, Inc.
AECOM
Baxter & Woodman, Inc.
Berryman
Bolton & Menk, Inc.
Brierley Associates, LLC
Brown and Caldwell
CDM
Clark Dietz, Inc.
Crawford Murphy & Tilly, Inc.
Dixon Engineering
Donohue & Associates, Inc.
Foth
HR Green
Inland Power Group
McMahon
Ruekert & Mielke, Inc.
SEH
Stantec
Strand Associates, Inc.
Symbiont, Inc.
TKDA
Trotter and Associates, Inc.
Xylem

Equipment Repair & Rehabilitation
Process Equipment Repair Services

Filter Media
CEI Carbon Enterprises Inc.
Unison Solutions
Veolia

Filtration
CDM
CEI Carbon Enterprises Inc.
Evoqua
Huber
Lakeside
Mulcahy Shaw Water
Ovivo
Smith & Loveless Inc.
Veolia

Financial Services
Ruekert & Mielke, Inc.

Flow Monitoring
ADS

FRP Doors & Grating
Van Bergen & Markson Inc.

General Industrial
Berryman

Geographic Information Systems
Advanced Engineering and Environmental Services, Inc.
Baxter & Woodman, Inc.
Bolton & Menk, Inc.
Envirosight
Foth
McMahon
Ruekert & Mielke, Inc.
Symbiont, Inc.

Grit Removal Systems
Hydro International
Smith & Loveless Inc.

Inspector/Locators
Envirosight
Pollard Water

Laboratories/Supplies
Pollard Water

Land Surveying
Bolton & Menk

Leak Detection
ME Simpson

Manhole Covers & Frames
HD Supply Waterworks
Varec Biogas

Manhole Rehab
LMK Technologies
SpectraShield Liner Systems

Meter Reading Systems
HD Supply Waterworks

Meters/Meter Testing
ADS
HD Supply Waterworks
M.E. Simpson Co., Inc.

Nutrient Removal
Evoqua

Odor Control Solutions
Evoqua
Hawkins
Kemira
Kusters
LAI, Ltd.
Mulcahy Shaw Water
Pollardwater
Strand Associates, Inc.
TKDA

Operation Services
Baxter & Woodman, Inc.
TKDA
Veolia

Pipe & Appurtenances
American Cast Iron Pipe Co.
Layne Christensen

Pipelines
AECOM

Process Mechanical
Donohue & Associates, Inc.
Energenecs
Foth
HD Supply Waterworks
Kusters
Process Equipment Repair Services
Sanitaire
Van Bergen & Markson, Inc.

Pumps/Pump Systems
AECOM
Arcadis
Brown and Caldwell
CDM
Hawkins
HD Supply Waterworks
Lakeside
LAI, Ltd.
Mulcahy Shaw Water
Pollard Water
Smith & Loveless Inc.
Strand Associates, Inc.
Van Bergen & Markson, Inc.
Xylem

Renewable Energy Systems
Energenecs

Residuals/ Waste Management
BDP Industries. Inc.

Safety Products
HD Supply Waterworks

Septage Receiving Facility
BDP Industries. Inc.
Lakeside

Sludge Dewatering
Kemira

Storage Tanks/ Reservoir Systems
Arcadis
Clark Dietz
Dixon Engineering
DN Tanks
Foth
Pittsburg Tank & Tower Maintenance Co.
SEH

Stormwater
AECOM
Bolton & Menk

Surveys
Advanced Engineering and Environmental Services, Inc.
McMahon
Ruekert & Mielke, Inc.
Stantec
TKDA

Tank Maintenance
Pittsburg Tank & Tower Maintenance Co.

Tanks
SEH

Trash Rakes
Lakeside

Transfer Switches
Inland Power Group

Tunnel Design/ Geostructural Design
Brierley Associates, LLC

Valve Assessment
M.E. Simpson Co., Inc.

Valves
HD Supply Waterworks
Hydro International
J&S Valve
LAI Ltd.
Shand & Jurs

Water Quality Monitors
American Cast Iron Pipe Co.
Arcadis
CEI Carbon Enterprises Inc.
Mulcahy Shaw Water

Water Treatment Chemicals
Force Flow
Hawkins, Inc.
Kemira
PVS Technologies

Water/ Wastewater Infrastructure
LMK Technologies

Water/Wastewater Treatment Systems
Advanced Aquacultural Technologies
Advanced Engineering and Environmental Services, Inc.
AECOM
Arcadis
Baxter & Woodman, Inc.
Berryman
Bolton & Menk, Inc.
Brown and Caldwell
CDM
CEI Carbon Enterprises Inc.
Clark Dietz
Crawford Murphy & Tilly, Inc.
Donohue & Associates, Inc.
Energenecs
Evoqua
Force Flow
Foth
Greeley and Hansen
Hawkins, Inc.
HD Supply Waterworks
Huber Technology
Hydro International
Kusters
Lakeside
LAI, Ltd.
McMahon
Mulcahy Shaw Water
Olympus Technologies, Inc.
Ovivio
Process Equipment Repair Services
Ruekert & Mielke, Inc.
Sanitaire
SHE
Shand & Jurs
Smith & Loveless Inc.
Strand Associates, Inc.
Symbiont, Inc.
Trotter and Associates, Inc.
Unison Solutions
Van Bergen & Markson, Inc.
Varec Biogas
Veolia
Walker Process Equipment
Xylem

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LISTINGS BY COMPANY

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cskehan@idexcorp.com
www.adsenv.com

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www.advancedaquacultural technologies.com

Advanced Engineering and Environmental Services, Inc.
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Grand Forks, ND 58201
701-746-8087
Charles.Vein@ae2s.com
www.ae2s.com

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612-376-2000
askamericas@aecom.com
www.aecom.com

American Cast Iron Pipe Co.
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Birmingham, AL 35207
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www.american-usa.com

Arcadis U.S. Inc.
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Columbus, OH 43235-1447
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www.arcadis-us.com

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www.baxterwoodman.com

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info@berrymanequipment.com
www.berrymanequipment.com

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www.brierleyassociates.com

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cdmsmith.com

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dixonengineering.net

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www.foth.com

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www.kemira.com

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www.kusterswater.com

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www.krugerusa.com

Xylem Water Solutions Flygt Product
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denny.weber@xyleminc.com

Sustainability

By Julie McMullin

About a month ago, I had a copy of the *Isco Open Channel Flow Measurement Handbook* sitting on a chair at home, and my three-year-old son brought it over to me and said "read me this book." Granted I didn't read him the entire book, but we did page through the book to look at the pictures of weirs, flumes, and flow meters. When we were done looking at the book, my son said "I want to grow up big so I can go into a manhole." My heart warmed at the idea of a sewer engineer in the making! It is important to get kids interested in science and the environment at an early age so that they can hopefully develop interest throughout their lives. This made me start thinking about how we can make our profession, and our CSWEA organization, more sustainable.

Sustainability has become a big buzzword in recent years, particularly in regard to the environment and resource consumption. I looked up the definition of sustainability on the Merriam-Webster website (*http://www.merriam-webster.com/dictionary/sustainable*) and found the following descriptions:

- Able to be used without being completely used up or destroyed
- Involving methods that do not completely use up or destroy natural resources
- Able to last or continue for a long time

While the principles of sustainability are typically applied to natural resources (e.g., water, oil, crops), I believe they can also be applied to our CSWEA organization, where members are the valuable resource that must be sustained.

Part of sustainability is making investments in the next generation, so that resources continue to be available in the future. As a result, I have set some goals for this year to make our section more sustainable. One of these goals is to add at least one student section to our ranks. Strong student sections lead to more Young Professional members, which replenish the section as other members retire or move on to other things. We are also trying to start a mentoring program for students, to help students figure out what they want to focus on professionally, and get a kick-start on their professional networking. This will help to show students the value of CSWEA membership.

Part of sustainability is making sure that existing needs are met in the future. Each year, our section has many successful webinars and conferences. Over the course of this year, we are trying document the steps to making these events successful so that these events can be continued into the future. This will help us to prepare for a transition in leadership, whether expected or unexpected. Hopefully this will also make it easier for new and existing members to become more active, since the expectations of the role will be clearly defined, and will help prevent our existing, active members from being over-committed.

Sustainability is also being aware of the impact of your actions. CSWEA recently launched the Global Initiative, where we will be helping the small community of Piedras Blancas with the management of their wastewater. Our Executive Director, Mohammed Haque, and two other CSWEA members (Amanda Heller and Past Wisconsin Chair Dave Arnott) will be visiting Piedras Blancas at the end of the month. During their visit, they will gather the information needed for the development of a solution to the community's wastewater issues. The Student Design Competition will take the gathered information and design a solution, and ultimately the winning solution will be implemented at Piedras Blancas. Kudos to Mohammed and the Global Initiative planning committee for developing a program that offers opportunities for personal growth, helps a community in need, and provides a catalyst for innovation for the student designers. We look forward to some real impact from these actions.

I hope these ideas have helped you start thinking about how we can make CSWEA more sustainable. I am proud to be a member of CSWEA and hope that making CSWEA more sustainable will allow future generations to enjoy the benefits of membership and serve our industry for years to come. CS

"Part of sustainability is making investments in the next generation, so that resources continue to be available in the future. As a result, I have set some goals for this year to make our section more sustainable."

Make a Difference; Start Now

By Tracy Hodel

The following quote was included in my last Message from the Chair that talked about how to make a difference. As Section Chair, I see first-hand how Minnesota Section members take action and make a difference.

> "How wonderful it is that nobody need wait a single moment before starting to improve the world." ~ Anne Frank

Several of Minnesota Section members attended the CSX Exchange in Wisconsin this past July. The primary objective of the meeting was to share ideas and discuss on how we can improve the organization. Also discussed was the 2014 Annual Meeting. What were the highlights of the Annual Meeting, what improvements are necessary to make the 2015 Annual Meeting even more successful? The organization's Strategic Plan was discussed as well.

The CSX Exchange was a great opportunity to share ideas and provide for the development of actionable goals for the Minnesota Section. The Section membership and committees are already working hard towards making a difference. Thank you to all current volunteers who dedicate so much of their time to continue to make this organization an outstanding resource to all the members of CSWEA.

The goals below are ideas for continuous improvement and provide opportunities to do even more, and make a large impact. These goals were developed by several section members.

1. All Minnesota Section committee nominate at least one person for the Annual Awards to recognize the achievements and service of others in our organization.
2. Develop a succession plan for each committee. Reach out to others that may be a great addition to the committee or the organization; mentor them.
3. Welcome new members; develop a welcome packet.
4. Recognize members that have reached milestone years of membership.
5. Promote Operations Challenge.
6. Continue to make CSWEA stronger in becoming a valuable resource for stormwater and water resource professionals.
7. All committees hold at least two meetings a year: prior to the November Conference on the Environment and before the May Annual Meeting.

Action plans for these goals are being developed and an update on the status of these goals will be provided in future correspondence.

Another opportunity to make a difference that was discussed at the CSX Exchange was CSWEA's Global Initiative. There are not a lot of organizations that help provide cleaner, safer sanitary services throughout the world. CSWEA is striving to start an initiative that focuses on partnering with local organizations within communities that are experiencing significant water sanitation issues. By the time this article is published, a group of excited, motivated volunteers will have went to Costa Rica to help a small community with insufficient wastewater treatment, located in Piedras Blancas, that has created outbreaks of dengue fever, hepatitis and leptospirosis.

We all should be proud to be a part of an organization that is making such an enormous contribution by using their skills and volunteering their time to help others. For more information on this exciting initiative and on how you can become involved, contact Mohammed Haque at *mhaque@cswea.org*.

Hopefully this message has provided you with several opportunities to make a difference and improve the organization. Start now; it just takes one SMALL action to make a BIG difference. CS

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We Make a Difference

By Rich Hussey

In mid-July the Water Environment Federation and World Business Chicago held a summit titled "Global Lessons from Great Water Cities." Chicago Mayor Rahm Emanuel, during his keynote, was quoted as saying, "A quarter of the world's fresh water is right here in the Great Lakes. It is our Grand Canyon, our Yellowstone. How we deal with it, how we manage it and how we are stewards of it will define our future." Water and wastewater are increasingly becoming discussed in the national media along with our local regional media. It is organizations like CSWEA and WEF that allow us as professionals to make a difference and exchange ideas to enhance our profession and define our importance within the general public. This is why it is important for our members to become active and participate – it only strengthens us as a group.

The IL Section has been busy in recent months and we continue to look forward to future meetings and events. We have recently lost an active Young Professional as she made a career and location change, but we look forward to seeing who will fill in her shoes. We wish Mandy Poole all the best in her new role – I can't imagine how she will be able to make it with the weather being 72 degrees and sunny every day.

Central States held its annual CSX in the Wisconsin Dells in mid-July. There was a strong IL Section presence at the exchange and would encourage members to participate in future CSXs. The exchange allows members to understand the strengths and weaknesses of the organization along with understanding CSWEA's vision. Mohammed prepared a nice summary, but if you were not able to attend CSX and would like to discuss the meeting or discuss ideas of your own, please contact anyone of the chairs or me. We are always looking to improve the IL Section and CSWEA.

The IL Section also held a shared YP event with IWEA. An annual event for the YPs to gather and go to Top Golf Academy, where it allows YPs to be in a social setting and practice on their golf skills. There are a number of golf target games and an opportunity to work with one of the golf pros. It is always a nice event and it allows the YPs to meet their peers within the organizations.

We recently held a business meeting at Wheaton Sanitary District. Approximately 17 chairs, co-chairs, and members were in attendance. We appreciate Wheaton SD offering their location for the meeting to be held as it served as a great meeting location. The business meetings allow the chairs to discuss the various items within the state section and discuss upcoming events. The state section and CSWEA should be encouraged that the IL Section has a strong contingency of younger members serving as chairs or co-chairs. I have personally been involved with CSWEA nearing 14 years and actively for the past eight or nine years. I do not recall ever seeing the youth that the IL Section now has involved as their leaders. It is encouraging that we are building the next leaders of CSWEA and look forward to seeing how we can strengthen our organization further. It also serves as a reminder that anyone who is willing to give some time to the organization can have a significant impact even at an early age. There are so many benefits of being actively involved with the CSWEA organization, so why not try an introductory level to start.

Finally, we hope to see members at upcoming events for the IL Section:

- Operations Seminar September 12 at the Dekalb SD
- CSWEA/IWEA Welcome Reception September 28 at WEFTEC in New Orleans
- Biosolids Seminar – Location and Date TBD

"It is encouraging that we are building the next leaders of CSWEA and look forward to seeing how we can strengthen our organization further."

SEPTEMBER 2014

IL Section 2014 Operations Seminar
September 12, 2014
Dekalb Sanitary District, DeKalb, IL

CSWEA/IWEA WEFTEC Welcome Reception
September 28, 2014
Hilton New Orleans Riverside, New Orleans, LA

WEFTEC 2014
September 27-October 1, 2014
Morial Convention Center, New Orleans, LA

NOVEMBER 2014

Wisconsin Watershed Webinar
November 12
With free in-person viewing available at the Global Water Center in Milwaukee

MN Section Conference on the Environment
November 19, 2014
Univ of Minn-St. Paul: Continuing Ed

CSWEA 19th Annual Education Seminar – WEBINAR
Online Webinar (Pre-Recorded)

FEBRUARY 2015

CSWEA Midwest Water Industry Expo (w/WWA)
February 3-4, 2015
Kalahari Resort, Wisconsin Dells, WI

32nd Annual Innovative Approaches to Wastewater Operational Problems
February 10, 2015
Holiday Inn, St. Cloud, MN

MARCH 2015

WaterCon 2015 (w/ISAWWA)
March 23-25, 2015
Crowne Plaza, Springfield, IL

APRIL 2015

19th Annual Education Seminar
April 7, 2015
Monona Terrace, Madison, WI

MAY 2015

88th Annual Meeting
May 18-21, 2015
Drury Lane, Oakbrook Terrace, IL

For up-to-date CSWEA events, visit our website *www.cswea.org*.

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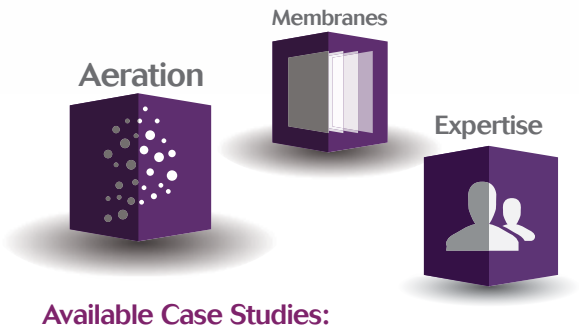
OVIVO® mbr

One System Many Solutions



Recently awarded a contract to supply equipment and process support for the largest MBR plant in the world at 42 MGD, Ovivo®MBRs are also being used to meet the most stringent nutrient limits in the country; especially as part of retrofit projects, upgrades and expansions.

For example, at the 2.7 MGD Ruidoso WWT plant, total nitrogen is less than 2.3 mg/l in the final effluent…without adding supplemental carbon.

Available Case Studies:

Washington (TN < 12 mg/l)

Supplied equipment, design support, commissioning and technical support for the upgrade of an existing SBR. Currently rated to handle 0.86 MGD, the plant can be doubled in the future to handle anticipated growth.

"The electrical is higher, the solids production is lower and we are now able to use non-potable water in the plant (couldn't with SBR). With these three factors, it's about the same cost for the MBR and SBR…"

- Plant Supervisor

New Mexico (TN < 10 mg/l)

Supplied equipment, design support, commissioning and technical support for the upgrade of an existing SBR. The new Ovivo®MBR doubled capacity from 0.8MGD to 1.6MGD in the same footprint.

"The Ovivo®MBR design, and installation approach, allowed the old SBR to continue operating with no down time throughout the construction phase of the retrofit."

- Owner

Massachusetts (TN < 7 mg/l)

Commissioned the first single-stage MBR using simultaneous nitrification and denitrification combined with concentrated oxygen. This 30,000 GPD plant can also operate at very high solids concentration to significantly reduce hauling expenses.

Replacing a failing trickling filter with a high-rate MBR costs less than $1M and reliably produces effluent with a total nitrogen (TN) of less than 7 mg/l.

OVIVO USA LLC
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ovivowater.com

Ovivo is represented by

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Total Process Treatment Solutions

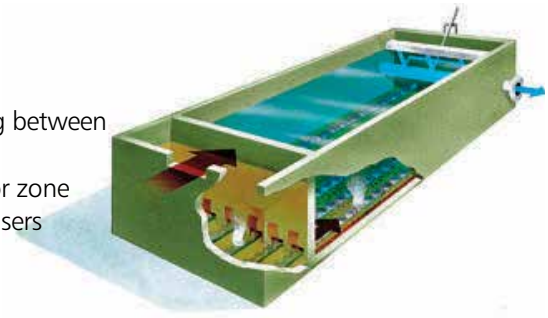
SANITAIRE® and ABJ are world leaders and industry standard in wastewater treatment plants throughout the world with equipment operating in thousands of facilities. Years of dedicated and knowledgeable engineering have led to the development of our various process treatment solutions.

Fine Bubble Aeration Equipment

- High oxygen transfer capabilities and low operating costs
- Proven piping and support system for long-term reliability
- Ceramic disc and membrane disc configurations available
- Minimal maintenance requirements

Sequencing Batch Reactors (SBRs)

- Continuous flow operation yields smaller basin volumes, equal loading between basins and allows for single basin operation
- Enhanced biological nutrient removal with the use of pre-react selector zone
- Low cost operations with high-efficiency SANITAIRE® fine bubble diffusers
- Easily expandable to account for increasing future plant flows



Oxidation Ditch

- Excellent effluent quality including biological nutrient removal
- No submerged mechanical aerator devices
- Lower maintenance costs than comparable technologies
- Low cost operations with high-efficiency SANITAIRE® fine bubble diffusers

DrumFilters

- Low energy consumption - power only required during backwash cycle
- Wide range of capacity: 100 - 2,500 gpm per unit
- All corrosion resistant components for long term reliability
- Minimal maintenance requirements

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