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THE 87th ANNUAL MEETING OF CSWEA

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THINK GREEN

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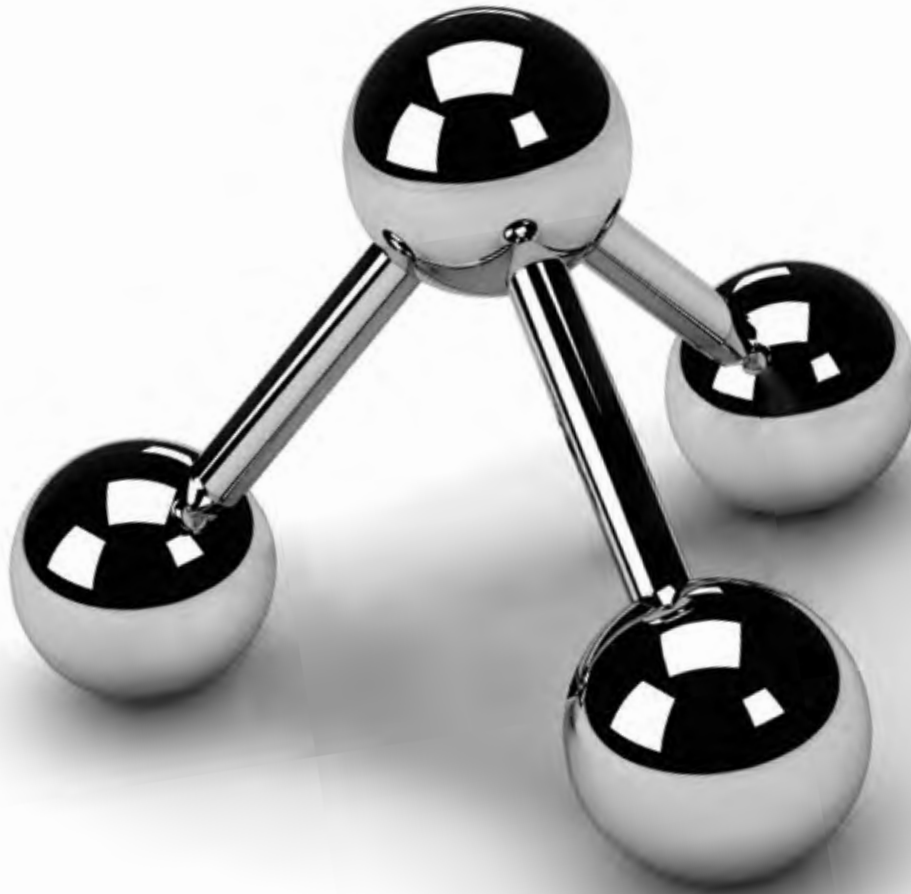
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My Passion is Water, What is Yours?

By Jim Huchel



The bags are packed, I'm checked out of the hotel, the long drive home is complete, and the 2014 CSWEA annual conference is over. As I reflected back on the conference, there were many opportunities for professional development such as the networking, the vendor booths, and the educational sessions. I thought to myself, this was a great conference. This was due to the efforts of our past president and the entire LAC committee. The work they performed to make this a successful conference, has set a high bar for next year's conference. To Patti, the LAC committee, Mohammed and Amy Haque, the vendors, consultants, and the attendees, I thank you for your efforts and for your attendance.

If you were not able to attend the conference, there were some notable changes. The keynote speaker taught us the soft skills of leadership. There were classes available on ethics and events for our young professionals. All in all, the conference was very well rounded, and I heard positive feedback from my fellow attendees. I personally enjoyed the ability to meet new vendors, visit with old friends, and to meet some of our young professionals.

Our WEF visitor this year was President Sandra Ralston who spoke about garnering passion for the industry. She also introduced new WEF initiatives, which include the creation of a program that will standardize operator licensure throughout the country. Such a program would allow utility managers to hire any certified operator with the confidence

that they have the requisite knowledge for the position regardless of where they come from. This standardized certification would be a benefit to both operators and managers.

Perhaps though, if more people knew about our field we wouldn't be seeking new staff from across the country because we could generate qualified applicants from within our own states or even our own communities. My passion is to educate people about our profession, and during my address, I challenged the banquet attendees, and now you, to do the same over the next year. Teach someone about how our field, and we as individuals make a difference in the everyday lives of our residents and customers and about what we do to protect the environment. By nature, I think most people in our industry would rather remain out of sight, and most of those who use our services would like to keep what we do out of mind. However, we are vital to our civilized society and to preserving the water resources available for the future. Please take the time to educate someone about the importance of what we do.

My other passion is to get people involved, as many people I have asked (coerced) to volunteer will tell you. I encourage you to dedicate a small amount of your time to a committee. Many people who volunteer, may only help with one item each year, but that small contribution helps enhance organization functions. Thank you to all the people who have in the past and to those who still donate their time. Without these people, we can't survive as an organization. If you don't know what you

can do to get involved, contact your state section leaders (available on the CSWEA website).

As an organization, we are outstanding educators both in and out of the classrooms, and our areas of expertise range from the technical knowledge of our field to the broad scope of organizational management to an array of interests or specializations that any particular individual may possess. If you missed my presentation, I thanked Mr. John Leonard for showing me how to be a wallflower. (For those of you who don't know John, he's anything but a wallflower.) I thanked many others for their encouragement to become a more active member of this organization. I have learned from many people throughout CSWEA and have made many friends from all three states.

Pulling notes from those who brought me up, I encourage you to take the time to introduce yourself to your state section leaders and members of the executive committee (we would enjoy meeting you). Talk with the young professionals of our organization, as they are the future leaders. Many of us have thought that we can't make a difference, but I believe if we collectively do just a little, will lead to a cleaner environment, and a first-class organization.

Again, thank you all for your participation. I truly believe it's the diversity and activity of our membership that makes CSWEA great. I wish you all a safe and happy summer. **CS**



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WEF Delegates Report

By Rusty Schroedel and Eric Lecuyer



WEF EXECUTIVE DIRECTOR

The Water Environment Federation formally announced on February 4, 2014 that Dr. Eileen O'Neill has been named the new Executive Director.

O'Neill replaces former executive director Jeff Eger who resigned in July 2013. Dr. O'Neill has been serving WEF as the Interim Executive Director since Mr. Eger's departure and prior to that, she was Deputy Executive Director. "Dr. O'Neill is an experienced association executive with strong water sector knowledge based on diverse domestic and international experience," said WEF President Sandra Ralston. "She has a proven track record during her 20-plus years with WEF delivering highly successful technical programming, increasing revenues and building partnerships."

It was noted by WEF Vice President Paul Bowen at WEFMAX in Whitefish that Dr. O'Neill has brought a new level of enthusiasm to WEF headquarters in Alexandria with WEF staff being highly responsive to her leadership style and initiatives.

WEFMAX

As of this report, the 2014 WEFMAX meetings have been completed, with WEF Delegates Rusty Schroedel and Eric Lecuyer both attending WEFMAX in Whitefish, Montana, and Keith Hass and Mohammed Haque attending WEFMAX in Charleston, South Carolina. WEF Vice President Paul Bowen provided an excellent update on WEF business and discussed many of the new initiatives undertaken by WEF to improve its

business operations including updating and revising its approach to obtaining goods and services in order to take advantage of competitive pricing. As usual, these events provide great insight into what other MAs are doing to better serve members and enhance their MAs at all levels. Rusty and Keith presented CSWEA's new business model for a flat rate pricing for utilities registering for the annual meeting as created by Mohammed Haque. Mohammed did a great job on preparing this presentation and it was well received with much interest by other MAs in adopting this approach to encourage utilities to send more staff members to the annual meetings.

Other topics of interest included a great deal of discussion of the successful use of social media to communicate with MA members and remind them of registration deadlines, events and in general create a sense of enthusiasm around events. The use of Facebook, Twitter, and other social media venues has proven to be more effective for some MAs as email blasts tend to become ignored by many as they are seen as repetitive and uninspiring.

A common theme of WEFMAX was communication, whether in the context of new and emerging communication tools available via social networking, Twitter, Facebook, or simply the need to maintain effective communication between member associations like CSWEA and WEF. CSWEA's WEF delegates are the communication link between our members and WEF leadership and it is our job to let you know what is going on at WEF and to articulate members concerns to WEF. All

are encouraged to discuss any concerns, ideas or suggestions with your delegates, Rusty Schroedel and Eric Lecuyer and Delegate Elect Doug Henrichsen.

Some other ideas from WEFMAX:

- To further engage operators for the operations challenge, have them attend other MA operator challenge events and fund that.
- To encourage more engaged student chapter advisors, pay for their membership, but require documentation of activity.
- Obtain and use the membership document from HOD Workgroup.
- Use past officers as mentors.

WEFMAX is a great opportunity for MA leaders of all levels to learn more about WEF and what other MAs are doing and we would encourage all CSWEA leaders at the association and State Section level to attend WEFMAX whenever possible.

WEF HOD WORK GROUP UPDATE

The WEF House of Delegates Standing Committees and Work Groups continue to make progress on completing their assigned tasks and updates are being provided at each of the WEFMAX meetings. Most Work Groups are making good progress on meeting their goals by WEFTEC in September. Rusty Schroedel reported on progress the Strategic Planning WG has made to date and Eric Lecuyer reported on the MA Sustainability at WEFMAX in Whitefish. Many of the Work Groups tasks are inward looking, how we can improve the House of Delegates, WEF and better support

Continued on page 10

Continued from page 9

MA's success and sustainability. The Work Group that has made the most impact on outward looking goals is the Nondispersibles work group. Below is part of that Work Groups product, resources and information that can be directly used by operators, facility managers and others to begin to deal with the significant problem created by nondispersibles.

SOLVING THE NONDISPERSIBLE PROBLEM

WEF members work to address the problem of clogging pipes.

Water resource recovery facility (WRRF) personnel continually must deal with items in the wastewater stream that simply don't belong there. Called nondispersibles, these materials take many shapes, but as the number and variety of packages of wet wipes accumulate on store shelves, they also are accumulating in collection systems. WEF, its members, and others have been working to solve the problem.

During the WEFTEC 2013 Technical Session 610, "Wipe Out: Reducing the Burden of Wipes in the Pipes," speakers and panelists representing WEF, the Association of the Nonwoven Fabrics Industry, the National Association of Clean Water Agencies, as well as manufacturers of disposable wipes and WRRF equipment provided a comprehensive view of the sources of contention that surround the topic.

The issue recently has garnered much attention from the press and public. However, according to session moderator Robert Villée, disagreement remains on many topics, such as the definition for *dispersibility*, culprits for clogs, the timeline for implementing solutions, tests to verify product flushability, and proper labeling.

"It's a difficult issue, and there are a lot of nuances," said Villée, who is executive director of the Plainfield Area Regional Sewerage Authority (Middlesex, NJ).

Fixing the nondispersibles problem "will require a coordinated national effort" in which WEF works with other organizations in both the water and wastewater arenas, said speaker Aubrey Strause, owner of Verdant Water PLLC (Scarborough, Maine). While the challenges seem daunting, WEF

members and WEF member associations have started working on the problem and have been gaining momentum.

WEF, NACWA, and the American Public Works Association have approached the issue together. The three organizations are working to build consensus on flushable standards, educate the public about the problem, and compile information on regional efforts in North America to solve the problem, Strause said.

"The next step will be for these national groups to lead the development of a definition of *flushable*," she added.

The WEF Collection Systems Committee (CSC) Flushables Task Group has been working to solve the problem since 2010; and at WEFTEC 2012, the WEF House of Delegates Nondispersibles Workgroup formed. "HOD is tasked with supporting the CSC by getting the MAs involved and supporting efforts to bring pressure on the nonwoven fabric industry to change business as usual," said Hiram Tanner, DC Water manager and WEF House of Delegates (HOD) Nondispersible Workgroup member. Tanner explained that the HOD workgroup is collecting and compiling information on incidents caused by nondispersibles into a database. The information will be used to help encourage legislators to act.

Independently, WEF CSC members and Delegates have been spreading the word on nondispersibles. They have been giving presentations at conferences and events across the country, as well as communicating with government, manufacturer, and industry leaders.

Villée has even been working to put manufacturers' flushable-product claims to the test. He has assisted in two field studies in Portland, Maine, to see if flushable products are dispersing in sewer lines, he said. In addition, he recently worked with Plainfield Area Regional Sewerage Authority staff to test flushable-product claims. He found that *flushable* wipes took an average of 10 flushes before pieces started to break off; one piece remained intact for 100 flushes, he said.

In January 2014, the Maine Wastewater Control Association and INDA launched a public education

campaign to raise awareness that baby wipes should not be flushed. Research will be conducted before and after the campaign to evaluate consumer behavior.

"We need to increase the awareness on the part of the consumer," Strause said. The goal is to encourage user to follow the advice, "When in doubt throw it out," she said.

To evaluate the campaign's success, Scott Firmin, session speaker and director of wastewater services for the Portland Water District (Maine), will collect materials collected from the Westbrook Pump Station screen during a one-hour timeframe. He will document any changes in consumer behavior, Strause added. The \$113,000 campaign focused on communications outreach and advertising will end and its success will be evaluated between March and April, she said.

In addition, WEF, NACWA, INDA, and APWA are forming a technical workgroup that will begin meeting in early 2014, said Cynthia Finley a speaker at the WEFTEC session and director of regulatory affairs at NACWA. The group will work on determining mutually acceptable definitions for terms, flushable guidelines, appropriate testing, and labeling for products, she said.

"The core need is to educate the public that things that don't act like toilet paper should not be flushed," Strause said. Working toward this goal and fixing the problem "will require a coordinated national effort" in which WEF works with other organizations in both the water and wastewater arenas, she added.

For more information see the following materials available online:

- *Wipes in Pipes Cause Costly Problems for Water Resource Recovery Facilities*, published in WEF Highlights, January 2014.
- *Wipes in the pipes: WEFTEC speakers discuss contentious issues surrounding convenience wipes and collection systems*, published in WE&T, December 2013.
- *The incredible growing 'fatberg,'* published in WE&T, November 2013.

- *Tackling the Wipes in the Pipes* WEF-wide, published in WEF Highlights, October 2013.
- *Stop, Don't Flush That: WEF members work to solve nondispersibles problem*, published in WEF Highlights, June 2013.
- *Wipe Out: One utility's public battle against disposable wipes*, published in WE&T, August 2008.
- *Will It Flush?* a video produced by the City of Spokane [Wash.] Department of Wastewater Management on WEF's YouTube Channel.
- *Flushability Guidance Document* released by INDIA.
- WEF bill stuffers and fact sheets educating about the issue.
- *Flushable or Not? Dispersing the Non-Dispersible Problem*, a webcast hosted by WEF with the recording available online.
- *Management of Non-Dispersibles in Wastewater*, a position statement released by the New England Water Environment Association.
- *Don't Flush Baby Wipes*, public education campaign information provided by the Maine Wastewater Control Association.
- *Pump Clog and Nondispersible Wipes*, Resources Web page provided by the Maine Wastewater Control Association.

VALUE OF WATER

A progress report on the Value of Water campaign was released on May 5. For more than a year, the Value of Water (VoW) Coalition, a group of water-industry businesses and organizations has been collaborating on a campaign to increase public awareness on the importance of the reliable delivery of clean and safe water and treatment of wastewater and the need for sufficient investment in infrastructure to ensure these services in the future.

In early 2013, the Value of Water Coalition began its work by creating infographics, slide decks and videos and sharing them through social media channels. It also established a web site at www.thevalueofwater.org,

and initiated a blog and established a regular Twitter presence. The program was officially launched October 1, 2013 and we are pleased to announce additional progress being made by the coalition.


Since January 2014, the U.S. Water Alliance has been facilitating the activities of the coalition with the guidance of Ben Grumbles. At a January 27 meeting, the coalition agreed to focus its message and campaign on water infrastructure and jobs and build a strategic partnership with an informal network of general managers of water and wastewater utilities launching a similar effort. The objective, having shifted when the coalition sought to align with the Ad Council, was clarified:

The VoW Coalition seeks to inform and inspire the public about the value of water and its connection to water infrastructure so that they may act in their own best interests to support local leaders for investing in water infrastructure.

The campaign's message going forward will be built around the tagline – **Water Works!** – with messaging focused on the ways in which:

- Water Connects Us
- Water Grows Jobs & Opportunity
- Water Keeps Us Safe & Healthy
- Water Sustains Our Environment

Other activities include:

- Infrastructure Week anchor event on May 14 in Washington, D.C. at the Newseum in collaboration with the U.S. Chamber of Commerce and other interests.
- Critical Coordination with the network of General Managers focused on economy/jobs.
- Social media following has grown since the October launch.
- VOW Book under way.
- *TheValueofWater.Org* website is under redesign to simplify the site, focus on key revised messages, blog postings, etc.
- Upcoming speaking engagements and regional collaborations as part of an earned media strategy. 



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Global Initiative Inaugural Trip On for August

By Mohammed Haque



I have been told by several people that the Annual Meeting in St. Paul was among the best CSWEA annual meetings ever held in Minnesota. For a microsecond, I had myself convinced that it had a lot to do with me, but then Amy swiftly brought me down from the clouds. She reminded me that CSWEA had a lot going for it this year. We had an amazing Local Arrangements Committee led by Mark Enochs and assisted by Patti Craddock. The members of the LAC gave an amazing amount of time to make this year a huge success.

We also had excellent technical content thanks to our superb Technical Committee that took on the extra effort needed to add a fourth track this year. With the leadership of Tracy Hodel, they even put together a superb ethics session that was very well attended, and found an outstanding keynote speaker in Bruce Miles. It will be hard to top that, but we will try again next year as we look to continuously improve and innovate.

In addition, we had great exhibit hall attendance and the sponsorships

for this conference blew everyone's expectations. What a generous group we have at CSWEA and thanks to Matt Fritze and Annika DuShane for their hard work soliciting exhibitors and sponsors.

The Tuesday social was also a resounding success, although we had many Minnesota Wild fans competing for the same space. Thanks to all the YPs and Anna Munson for coordinating things at Great Waters.

The Utility Pricing certainly helped with attendance and we ended up

“We also had excellent technical content thanks to our superb Technical Committee that took on the extra effort needed to add a fourth track this year.”

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“The CSWEA Executive Committee was able to announce a scholarship in the total amount of \$1,500 for YPs to help cover costs of some of them to travel to Costa Rica to scope and do preliminary engineering on the Piedras Blancas wastewater project.”

with attendance around 425, up 10% from Madison the previous year. And the St. Paul location and venue were also ideal for both travelers and locals. I certainly hope we can revisit in 2017.

I'm sure I have missed people that we should be grateful for, so forgive me in advance, and thank you for all you do for our association.

CSWEA GLOBAL INITIATIVE

One thing that I would like to mention is that we had an outstanding Silent Auction for the new CSWEA Global Initiative. Through the generous donations we raised close to \$2,500.

This is considerably more than we have raised in past years. As a result, the CSWEA Executive Committee was able to announce a scholarship in the total amount of \$1,500 for YPs to help cover costs of some of them to travel to Costa Rica to scope and do preliminary engineering on the Piedras Blancas wastewater project. So YPs, we hope you can be involved as we try to bring a central wastewater solution for this community of 100 homes.

Plans are set for our inaugural Global Initiative trip. A group of 5-8 CSWEA members will be travelling to Piedras Blancas between **August**

27 to Sept 2 to visit the project site, observe, and assist with surveying and develop a scope for the project that we can then roll out as a design challenge for our student design competition. Stay tuned for more details and if you are interested in participating, we would love to hear from you. Please contact Eric Lynne, chair of the CSWEA Global Initiative (elynne@donohue-associates.com) or me at mhaque@cswea.org to let us know of your desire to participate in this worthy endeavor. **CS**

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CSWEA's 19th Annual Education Seminar

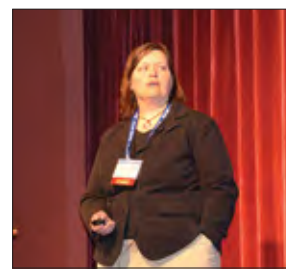
Sustainability

The 2014 Education Seminar featured a program focused on sustainability. The seminar highlighted several aspects of sustainability in our industry including innovation, Utilities of the Future, deammonification, succession planning, and innovative project delivery methods. Case studies of sustainable utility efforts from Illinois, Minnesota, and Wisconsin

shared methods of incorporating sustainability into your utility. The day featured a pairing of talks on integrated planning and green infrastructure that addressed sustainable improvements to evaluate outside of the fence. A strong theme of the day was the role our people and relationships help create a more sustainable industry. Do you have a moment in your career

that is your sustainability moment – the moment when you realized that it was worth the effort to make things more sustainable? Several speakers shared their sustainable moments throughout the day.

The 19th Annual Education Seminar will be produced as a webinar available for purchase through the CSWEA website, www.cswea.org. [CS](#)



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THE 87th ANNUAL MEETING OF CSWEA

WATER – OUR PASSION

If you attended the 87th Annual Meeting in St. Paul this past May, I hope it provided the opportunities you were seeking. Our organization appreciates your support of our mission to provide for the exchange of water quality knowledge and experiences among its members and the public and to foster a greater awareness of water quality achievements and challenges. We look to you “to provide bold leadership, drive innovation, raise public awareness, and leverage our knowledge” – strategic directives of WEF.

This year’s annual meeting had some new offerings: a preconference workshop on safety issues, the young professionals’ leadership academy (past ones were associated with the April Education Seminar in Madison), and a utility pricing registration structure. We continued our excellent series of technical sessions and added a fourth track to focus on operations and utility leadership, as well as an ethics track to meet new licensure requirements. We had several social events to greet old friends and make new acquaintances – and balance the technical talk with getting to know the people doing the work – and sharing our passion for water.

The annual meeting is a heroic effort of a team of volunteers. Listed below is the amazing team that made this year’s meeting run smoothly – please thank them if you get the chance. My personal thanks to this year’s committee. You brought in new ideas and delivered them, handled working with a new venue, and met budget! My sincere thanks to all of you for your hard work.

MARK ENOCHS, MNX Inc. – 2014 Committee Chair

TRACY HODEL, City of St. Cloud, MN – Technical Program Chair, Audio/Visual

MATT FRITZE, Great Northern Environmental – Exhibits Chair, Sponsorships, Silent Auction

PAT OATES, MCES – Preconference Workshop

JIM MILLER, FOTH – Preconference Workshop

BEN CLAPP, Black & Veatch – Technical Poster Session

KIM REYNOLDS, Parsons Engineered Products – Catering

GEORGE SPROUSE – MCES Plant Tour

PHIL PARSON, Parsons Engineered Products – Golf Outing

JOHN GLATZMAIER, CH2M HILL – Golf Outing

DOUG HENRICHSEN, Brown & Caldwell – Registration

ANNA MUNSON, Black & Veatch – Tuesday Night Social

SUSAN DANZL, Short Elliott Hendrickson Inc. – 5k Run/Walk, Signage

PETE DANIELS, Wenck Associates, Inc. – Student Competition

ERIC LYNNE, Donohue & Associates – YP Leadership Academy

JIM ROTH, Retired – Farewell Breakfast Slideshow Preparation, Golf Outing

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TREVOR GHYLIN, Microbe Detectives

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ANDY BRADSHAW, City of Moorhead, MN

JEREMY CRAMER, Stevens Point WWTP

– Patti Craddock

Our pre-opening Monday activities were action packed. A full-day workshop featuring a variety of safety topics was held across the river from the Crowne Plaza hotel at the pavilion on Harriett Island. Hands-on and interactive sessions were experienced by a small group receiving training hours per OSHA requirements. The annual golf scramble at Oak Marsh Golf Course started mid-day on an overcast but mostly dry afternoon and a great time was had by all. The winners of the first flight with the lowest overall score of 61 were Erik Lanphier, Richard Hussey, Tim Tack, and Dean Chambers.

In the afternoon, the Young Professionals convened their leadership academy after a tour of Boerger’s facility. Topics ranged from energy sustainability to fracking for the group of 20. Monday event participants and new arrivals that evening enjoyed the view of the Mississippi River and St. Paul area from the top floor of the hotel during the Monday evening Meet and Greet. What a great turnout!

At the Tuesday opening session, Bruce Miles, owner and CEO of the Big River Group, LLC, provided us ideas on how to make a difference – looking at WEF’s strategic directives as outcomes. His energy and enthusiasm created a positive start to the conference and a call to use our passion for water to meet the goals we establish for ourselves, our companies/utilities, and our water environment. The technical program that followed on Tuesday and Wednesday provided a range of topics for attendees with pertinent and high quality presentations. We appreciate Dr. Paige Novak, Dr. Patrick Brezonik and Dr. Deborah Swackhamer for providing the ethics session. Thanks to all the moderators for your efforts and keeping the sessions timely. Our exhibit session spanned two days and brought attendees to the area for all breakouts and two poster sessions. The Tuesday exhibitor social event

was popular (based on consumption totals) and the CSWEA Global Initiative silent auction provided a significant start for financially supporting our new activity.

Following the success of last year's social event, we continued the tradition with a gathering at Great Waters Brewing Co. The number of attendees surpassed our planning levels; with the rivalry Wild/Blackhawks game just blocks away, it was a packed house. Despite the Wild's quest for the Cup being stopped by the Hawks, the evening appeared to be enjoyed by most!

On Wednesday evening we acknowledged several individuals and organizations in Central States with WEF and CSWEA awards. The 87th Annual Meeting winners are pictured on several pages in this magazine, so please look them over and congratulate the winners when you see them. For those who stayed through the wonderful music of guitarist Ken Wanovich, we ended the evening with the "Hey Jude" finale that those at the Illinois Annual Meeting in 2009 may recall.

The Farewell breakfast provided a relaxing venue to enjoy historic photos of our members at past CSWEA Annual Meetings, WEFTEC, operations challenge, and other events. We'll try to have this blast from the past at future venues. Following the breakfast, attendees participated in a tour of the MCES' Metropolitan Wastewater Treatment Plant, just five minutes from the hotel. Thanks to MCES staff and coordinator George Sprouse for providing this opportunity for our members.

In closing – a huge THANKS to our sponsors and exhibitors. It is your financial support and commitment to CSWEA that provides us the revenue to meet our operating expenses and deliver an affordable conference. We had a record number of sponsors this year – please review the sponsor list and thank these organizations for their continued support of CSWEA!

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Laboratory Analyst Excellence Award

Stephen Hansen
Fox River Water Reclamation District



WEF Service Awards

David L. Raby
WEF Delegate '11-13



Operations Award - Minnesota Section

Kathy Hamel
Western Lake Superior Sanitary District



William D. Hatfield Award

Dale Doerr
Sheboygan Regional Wastewater Treatment



CSWEA Service Awards

Patti Craddock
CSWEA President '13-14



Operations Award - Illinois Section

Todd Sheridan
Northern Moraine WRD, Island Lake, IL



Arthur Sidney Bedell Award

Timothy A. Tack
LAI, Ltd.



CSWEA Service Awards

Doug Henrichsen
MN Trustee '12-14



Operations Award - Wisconsin Section

Bruce Bartel
NEW Water, Green Bay, WI



George W. Burke, Jr. Facility Safety Award

Veolia Water Milwaukee
Accepting is: Michelle Helm



CSWEA Service Awards

Eric Lynne
YP Representative '12-14



Collection System Award - Minnesota Section

Joe Rubbelke
Infratech

Award Winners



Collection System Award - Illinois Section

Kevin Hausherr
Lakes Region Sanitary District, Ingleside, IL



Industrial Environmental Achievement Award

JBS Green Bay
Green Bay, WI (Accepting is Larry Collins)



Academic Excellence Award

David T. Tan
University of Minnesota – Twin Cities



Collection System Award - Wisconsin Section

Tom Grisa
Brookfield, WI (Accepting is Stanley Kucharski)



Young Professional of the Year Award

Eric Lynne
Donohue & Associates



Academic Excellence Award

Anthony Adderley
Minnesota State University - Mankato



Gus H. Radebaugh Award

"Taming Biological Phosphorous Removal Effluent P-Spikes"
Jared Greeno, City of LaCrosse,
Greg Paul, Quality Liquid Feeds, and **David Roskovic**, Chemsan



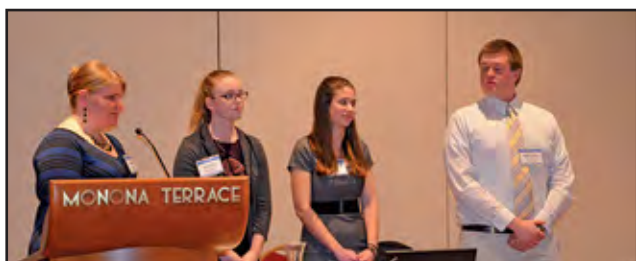
Bill Boyle Educator of the Year Award

Betty Jo Azpell
Divine Savior Holy Angels High School
Milwaukee, WI



Central States Water, Kelman Scholarship Award

University of Illinois, Urbana-Champaign's Student Team of Michael Azzarello, Hector Briceno, Reggie Jansen, Lance Langer, Namrata Logishetty, Donald Manhard and Alyssa Sohn for their paper "Combined Sewer Overflows in Mishawaka, IN"



Student Design Competition - Wastewater Design

Marquette University
Sara Breitzman, Andrea Dunn, Matthew Fueston and Sarah Walsh:
"Southeastern Wisconsin Regional Resource Recovery Facility"



Student Design Competition - Environmental Design

University of Illinois, Urbana-Champaign
Michael Azzarello, Reggie Jansen, Lance Langer and Namrata Logishetty: "Digesters for Sanergy"

5K Run/Walk

Fifteen runners and walkers participated in the 2014 Annual Conference 5k Run/Walk. The scenic route was along the Mississippi River in downtown Saint Paul and in the Harriet Island Park. To provide friendly competition, the winner of the race was the person who most accurately predicted their time to finish the 5K course. This year, there were three runners whose final time was within one minute of their predicted time:

Mark Eddington (DeKalb Sanitary District) within 13 seconds (who was also the first one in with an overall time of 20:42!).

Jon Butt (Symbiont) within 17 seconds.

Mike Holland (DeKalb Sanitary District) within 27 seconds.

Special thanks to this year's generous event sponsors Symbiont and Hobas Pipe. Also thanks to this year's event volunteers: Scott Mulinix, Jesse Anibas, and George Sprouse. [CS](#)

Golf Scramble

The 2014 CSWEA annual golf scramble was held on Monday afternoon. We played Oak Marsh Golf Course on an overcast but mostly dry afternoon, and a great time was had by all. The winners of the first flight with the lowest overall score of 61 were **Erik Lanphier**, **Richard Hussey**, **Tim Tack**, and **Dean Chambers**. The winners of the second flight with a score of 65 were **Tom Madigan**, **Bill Moore**, **Nick Kuhn**, and **Adam Shelton**. The winners of the third flight with a score of 68 were **Brandon Koltz**, **Phil Parsons**, **Tim Korby**, and **Loren Larson**.

A special thanks to the golf event sponsors:

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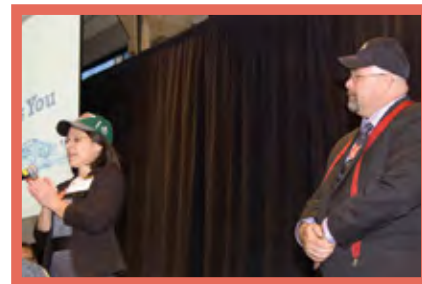
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CSWEA Leadership Academy

By Eric Lynne, (past) YP Representative '14

CSWEA held its Fourth Annual Leadership Academy on May 12 simultaneous to the golf outing at the Annual Conference in St. Paul, Minnesota. The seminar had 19 participants from various backgrounds who attended an industry tour and lunch at Boerger Pumps, followed by four YP-focused presentations. Many of these attendees were repeat attendees, which illustrates the true benefit of this seminar. However, we noticed a boost in Minnesota member attendance, which shows the true benefit of rotating the Academy to each Section.

The 2014 theme was *Fresh Perspectives*, implying discussions around how to identify and respond to common problems in our industry from a unique point of view. Presentation topics were titled: *Finding and Funding Energy Savings; Metropolitan Council Environmental Services (MCES) Energy Program; Wastewater – Oil Boom Style; Biohydrogen Production from Wastewater via Biologically Active Hollow-fiber Membranes.*

The presenters had a variety of backgrounds with both technical and business perspectives, from both young and senior professionals, all of whom demonstrated great tips for the attendees. Central States offers this seminar to all members, and although most of the attendees are starting their careers, we believe it is a great addition to the annual conference.



Boerger Pump tour: Front, L-R: Katie Richardson, Anna Munson, Micah Pitner, Adam Sealock, Colin Fitzgerald. Back, L-R: Bernhard Wessendorf, Jeff Seaton, Eric Lynne, Rebecca Alm, Jacob Strombeck, Micah Heckman, Drew Volbrecht.

“As I am nearing the end of my YP days, I am already thinking about how to get others in my office to attend this event.”

– Zachary Matyja, RJN Group

Due to the shortened time frame, the much-enjoyed ice-breaker style speed-networking event was omitted – instead, a personal networking discussion was held on the shuttle bus to and from the industry tour. We look forward to incorporating the speed-networking event as part of the 2015 YP Leadership Academy.

The seminar was held in conjunction with the Annual Conference, thus boosting the attendance at the Tuesday Night YP Social and Wednesday S&YP Business Meeting. All YPs who came in contact with me should have received yellow “My Future” Water’s Worth It buttons. The general

membership observed this and noticed a significantly growing number of active YPs in our organization.

I would like to personally thank the presenters again for their time and effort. The organization recognizes it and greatly appreciates it. Each of the state section S&YP chairs should also be recognized as they were all part of the planning and local arrangements. Also, thank you for the support – I am signing off as the CSWEA YP Representative, but plan to be engaged with future events. Mike Holland, as the incoming YP Representative will do a great job taking the Academy to the next level. [CS](#)

“We noticed a boost in Minnesota member attendance, which shows the true benefit of rotating the Academy to each Section.”



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Aerial view of Northern Moraine Wastewater Reclamation District

Northern Moraine Wastewater Reclamation District

By Eric Lecuyer & Todd Sheridan

The Northern Moraine Wastewater Reclamation District, or NMWRD, was formed in 1969 under the 1917 *Illinois Sanitary District Act* for the purpose of providing regional wastewater services to the communities of Island Lake, Lakemoor and Port Barrington, Illinois. Located in northeastern Illinois, the District straddles southwestern Lake and southeastern McHenry counties. The District has a very large service area with a facility planning area of 16,700 acres, of which 3,700 widely spaced acres are currently within the corporate boundaries. The District's facilities were originally constructed in 1978 when the District was known as the Island Lake Sanitary District with the name of the District changed in 2003 to better reflect the regional nature of the District and distinguish the District from the individual villages it serves.

The collection system initially consisted of two lift stations in Island Lake and has grown over the years to be comprised of 22 lift stations and over 75 miles of sewers. A low pressure sewer

system was constructed to provide service to the riverside Village of Port Barrington, to replace failing and flood-prone septic systems that were causing health and environmental concerns. The District owns and operates over 200 grinder pump stations that serve individual lots, vastly adding to the operations, maintenance and replacement burden on the District. The entire collection system is relatively modern and constructed of modern pipe materials including plastic truss pipe, PVC and HDPE materials with even the oldest parts of the system being less than 34 years old. As a result, there is very little inflow or infiltration and since the District has no significant industrial users, residential grease presents the main operation and maintenance challenges within the collection system. The District has recently completed a full system televising project wherein Red-Zone Robotics completed CCTV televising of all previously un-inspected pipes as well as inspections of each of the District's 1,505 manholes. The District's

operating staff, under the direction of Operations Supervisor Todd Sheridan, did a tremendous job of preparing for the televising project by cleaning more than 80% of the entire collection system in approximately six months using the District's Vactor and jetting equipment. Much of the work required access to remote lake front manholes and the need to drag hundreds of feet of hose through side yards. With this project complete and the powerful software included in the RedZone program, the District has completed many elements of a successful CMOM program.

The resource recovery facility is situated in an unincorporated area just south of the Village of Island Lake. The plant currently utilizes only eight acres of a 31-acre parcel, so there is more than adequate room for expansion. The plant is bordered on the north and west by a protected wetland that stretches to the Fox River and a scattering of residences to the south, the nearest being a quarter-mile away.

The original 1.2MGD plant constructed in 1978 consisted of a comminutor, raw pumping and two 78-foot diameter Topco contact stabilization package plants, followed by seasonal gaseous chlorination and a 4,500 foot, 30 inch outfall pipeline discharging through a submerged structure in the middle of the Fox River. In 1991 sulfur dioxide gas dechlorination was added due to IEPA requirements, and in 1992 the comminutor was replaced with a 31-inch Rotamat fine screen.

By 1998 the plant was nearing capacity, was over 20 years old and could not meet the newer ammonia nitrogen limits. The District commissioned a design-build project that increased the capacity of the plant and added treatment units needed to meet more modern discharge standards for BOD, Suspended Solids and new criteria for ammonia nitrogen. Nearly every part of the process was upgraded or replaced during the expansion completed in 1999.



NMWRD Clearspan

The existing Rotamat was supplemented with a higher capacity 40-inch unit and the four raw sewage pumps were replaced with higher capacity VFD driven units. A two ring, 1.2MG oxidation ditch with Orbal disc aerators was constructed and the original package plants were repurposed to serve strictly as aerobic digesters. The existing coarse and fine bubble diffusers were left in place in the repurposed digesters and one section was converted into two small gravity thickeners for solids stabilization and management.

Two new 85-foot secondary clarifiers and a 4MGD RAS pump station were placed online, as was a new chlorine contact tank. The chlorine and sulfur dioxide gas building was constructed adjacent to the new contact tank. A sludge handling building was constructed to house a 1.5 meter Komline belt filter press as an alternative to the existing drying beds. The resulting dried Class B sludge is stored onsite and ultimately land applied on area farms providing for beneficial use of this recovered resource.

Plant capacity was increased from 1.2 MGD to 2.0 MGD DAF, 5.0 MGD DMF, and the ammonia nitrogen being discharged was reduced from 20mg/l down to an average of 0.075mg/l. Thanks to good planning foresight, the clarifiers, RAS station and oxidation ditch were designed to be easily expanded to 3.0 MGD with BNR capability, but with the current flow just above 50% of design and population projections within the service area make it unlikely that a capacity expansion will be needed for 20 or more years.

Over the past three years, the District has completed a number of projects to enhance safety and customer service as well as improve facility operations and efficiency.



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NMWRD Covered Digesters

The District purchased the small horse farm adjoining the East boundary of the plant site and converted the house to an administration building and boardroom. The administrative office was relocated from the control building at the plant site and features a drive up window for the convenience of many customers who make payments in person.

In order to reduce safety risks, the District's operators converted the chlorination and de-chlorination system from gaseous chlorine and sulfur dioxide to a far safer liquid sodium hypochlorite and sodium bisulfite feed system. The District's operating team devised and constructed the system entirely in-house.

A Centrisys decanter centrifuge has been installed as the main sludge dewatering process, while the aging belt filter press serves as a backup unit. The centrifuge can also be used for mechanical thickening of sludge during the aerobic digestion process, reducing the District's



L-R: Tony Sahs, Bryan Gainer, Todd Sheridan, Eric Lecuyer, Russ Nelson and Andy Peterson.

dependency on good settling sludge and a good quality decant to create the volumetric capacity needed for waste activated sludge.

A section of the drying beds used for dewatered sludge storage has been covered with two ClearSpan engineered fabric covers to prevent the dewatered sludge from being rewetted by rain or snow. The covers provide for a minimum of nine months of storage and the results have been vastly reduced odors and very dry, high quality and easily handled sludge for land application.

The two existing aerobic digesters have been completely rehabilitated. The original package plant equipment was removed and a new Sanitaire full floor medium bubble aeration system and aluminum covers have been installed on each tank. This enhancement has provided much more digestion capacity, easily meeting the temperature design criteria, even during the extremely

bitter winter of 2013-14. The digestion process is so efficient that massive solids reductions have been experienced, vastly reducing the need to dewater sludge. A new high efficiency centrifugal blower with an 180hp VFD-controlled motor was included and is expected to use 33% less power than the three existing blowers combined, while meeting the aeration requirements for the digesters. The existing blowers will be relegated to back up units. The District was awarded a grant from the Illinois Clean Energy Community Foundation that will provide for 4.5-year payback for the high efficiency blower, based on energy savings.

An existing twenty-one year old 31" Rotomat screen has been replaced with a 36" Lakeside perforated plate screen to enhance removal of debris and non-treatable material from the influent. Design is under way to add variable frequency drives (VFDs) the Orbal disc motors for improved dissolved oxygen

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NMWRD Centrifuge



NMWRD Oxidation ditch - clarifiers

(D.O.) control and additional energy savings. The enhanced D.O. control will aid in the future undertaking of biological nutrient removal needed to meet pending phosphorus removal limits.

The District's staff consists of three highly experienced and dedicated operators, Andy Peterson, Russell Nelson and Bryan Gainer, led by Operations Supervisor Todd Sheridan. The operators are fully cross-trained and are responsible for the operation, maintenance and repair of the treatment facility and the entire collection system. With the initiation of an aggressive preventative maintenance program, system reliability remains very high with equipment failures being very unusual. A part-time lab technician performs most of the required monitoring for process control and compliance reporting with the three operators filling in and assisting with lab work when needed. District Clerk Maria Carrera and Assistant Clerk Debi Martin handle all of the administrative work including the monthly billing of the District's 5,000 customers, while District Manager Eric Lecuyer does his best to try to take credit for the outstanding work completed by the District's staff. The District is governed by a five member Board of Trustees that is highly committed to the District's success and sustainability and recently endorsed a long range Capital Improvement Plan intended to assure that funding is available to repair, replace or renew facilities and equipment as they reach the end of their useful lives.

The Northern Moraine Wastewater Reclamation District has an outstanding compliance record and constantly seeks to provide exceptional customer service. The District is committed to the professional development of its small staff with the operating staff frequently attending local operator meetings as well as seminars and other training opportunities. Operations Supervisor Todd Sheridan is looking forward to serving on one of the Central States Operations Challenge teams and the opportunity to compete at WEFTEC in New Orleans this fall. [CS](#)



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◀ REGULATORY UPDATE ▶

2014 WEF NACWA Fly-In

BRANDON KOLTZ, WISCONSIN TRUSTEE

The WEF Washington Fly-in was held jointly with the National Association of Clean Water Agencies (NACWA) April 7-9. The purpose of the Fly-in is to meet with the state congressional leaders to provide information about the wastewater industry, including federal legislation and appropriations affecting it. WEF regularly provides technical information with respect to environmental and water policy issues to congressional committees. The Fly-in is intended to educate state congressional delegations about not only national issues, but their effect on state utilities. It is also an opportunity to discuss issues specific to a state or a congressional district. Four individuals from Wisconsin made visits to six of the eight Wisconsin congressional

offices and both Senate offices. Congressional staffers attended the meetings; we did speak briefly with Senator Baldwin. WEF and NACWA prepared packets of information to leave with congressional offices.

A key issue for wastewater utilities nationally and in the Central States is aging infrastructure and new or continuing requirements for nutrient removal and increased level of service. *The Clean Water Act* calls for a federal role in funding, originally supporting planning design and construction with grants and currently through capitalization of state revolving loan funds. There are four financial areas that can enhance support for wastewater utilities:

- **Clean Water Revolving Funds.** Budget proposals would reduce

funding for Clean Water and Drinking Water Revolving Funds. We urged funding at the same level as the previous year. We also urged reauthorization of the revolving loan fund programs; the authorization has lapsed for about 10 years.

- **Clean Water Trust Fund.** A Clean Water Trust Fund would ensure that a dedicated, non-discretionary source of funding for the Clean Water State Revolving Fund program. Two bi-partisan bills have been introduced to authorize a trust fund. Sources of funding have not been finalized at this point. Representative Petri (R., WI) is a co-sponsor of one of the bills, H.R. 3582, **The Water Protection and Reinvestment Trust Fund Act.**

- **Water Infrastructure Financing Innovation Act (WIFIA)**. Modeled after the successful Transportation Innovation and Financing Act (TIFIA), WIFIA would guaranty loans of \$20 million or more at long-term Treasury rates. A pilot program is included in the Water Resources Development Act that passed the Senate and has been separately approved in the House. As of May 30, both House and Senate

Appropriations Committees have approved funding for SRF at the FY 2014 level and finding for the pilot WIFIA program.

- **Tax-Exempt Bonds**. There have been proposals to eliminate the tax-exempt status of municipal bonds. Tax-Exempt Bonds are the main source of funding for water and wastewater infrastructure projects. In the first 6 months of 2012, tax-exempt bonds financed

\$23 billion of water and wastewater infrastructure projects. Borrowing costs are estimated to increase 33 to 50% if the tax-exempt status is removed.

We urged that tax-exempt status for municipal bonds be preserved.

Other issues were discussed as well. Green infrastructure is becoming increasingly important as a management tool for both stormwater and combined sewer overflow management. The Innovative Stormwater Infrastructure Act of 2013 would encourage green infrastructure investment, ensure that U.S. EPA Office of Water promote the use of innovative stormwater solutions, establish Centers for Excellence for innovative stormwater control infrastructure to conduct research, establish industry standards, provide training and technical assistance to states and local governments with collaboration with institutions of higher learning, and provide grants. We urged increased funding for water quality research, which has been shown to provide a return on investment of 3:1 or better. The importance of technical innovations for utility performance and efficiencies was stressed in these meetings and in other WEF testimony before congressional committees. In this context, we discussed the Utility of the Future and entrepreneurial efforts such as the Milwaukee Water Council. Finally, we urged the Wisconsin delegation to join the Clean Water Coalition, a bipartisan group in Congress supporting clean water initiatives and reliable funding. If you have questions about these legislative initiatives, please contact Steve Dye at sdye@wef.org.

In addition to the congressional visits, there was discussion of regulatory and policy updates from WEF and NACWA staff and a panel consisting of representatives of the majority and minority counsels for the House Subcommittee on Water Resources and Environment of the Committee on Transportation and Infrastructure, the National Association of Water Companies and the U.S. Conference of Mayors. There were also talks regarding agency priorities by Bob Perciasepe, U.S. EPA Deputy Administrator, Nancy Stoner (Acting Administrator for Water), and representatives of Office of Science and Technology, Office of Wetlands,

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“There are a lot of voices out there, wastewater professionals don’t always raise their voices initially, and absence of commentary may be misinterpreted as acceptance. Make your voice heard...”

Oceans and Watersheds, Office of Wastewater Management, and Office of Groundwater & Drinking Water. Small roundtable discussion groups with U.S. EPA Headquarters senior staff provided an opportunity for frank discussions regarding Biosolids, Climate and Resiliency, Innovation/Utility of the Future Integrated Planning/Financial Capability, Nutrients/USDA’s RCPP program, Peak Flow Management, and Stormwater & Green Infrastructure. These discussions benefit utilities and other users as well as the agency representatives. U.S. EPA is not always aware of the difficulties with conforming to certain policies and can gain insight as to the actual application and results of different programs. Conversely, utilities can understand certain regulatory objectives and provide suggestions as to more successful implementation.

From these discussions it is clear that the protocol for assessing community financial capability, using median household income, is not representative for a large number of communities. U.S. EPA is examining alternatives to the current guidance. Second, resiliency of utilities to perform under changing climatic conditions will be increasingly important going forward. And green infrastructure will be an increasingly important component of wet weather stormwater management for both separate stormwater systems and combined systems, but the control metrics must be understood and demonstrated.

I have had the privilege of participating in the Fly-in for the last few years. It has been my observation that when making visits, we are but one of many groups and individuals meeting with congressional representatives and staff on a continuous basis. Most congressional members have a steady stream of appointments from early morning until into the evening. While we are very familiar with the issues that affect our industry, there may be little awareness unless we provide the information. Congressional members are concerned about issues that affect their constituents, and so relating the local needs and potential solutions to them brings the issue home to them. When legislation that would benefit wastewater utilities and their ratepayers is proposed, or not enacted, communication from the home district with specifics on effects has great importance. Similarly, U.S. EPA does not always realize the impacts of proposed regulations. Comments detailing specifically how a regulation would affect a utility or industry and alternate approaches to achieve the same objective are given substantial weight. There are a lot of voices out there, wastewater professionals don’t always raise their voices initially, and absence of commentary may be misinterpreted as acceptance. Make your voice heard through our state section Government Affairs Committees, the WEF Government Affairs Committee or other industry advocacy groups. Brandon Koltz may be contacted at Brandon.koltz@gmail.com. 



Magnetite Ballasted Technology to Meet Ultra-Low Phosphorus Limits:

A Pilot Study at the Fond du Lac Water Pollution Control Plant

By Jeremy S. Bril and Jane M. Carlson, Strand Associates, Inc., John Leonhard, City of Fond du Lac, and Sergio Pino-Jelcic, Evoqua Water Technologies LLC

Like many wastewater treatment facilities in the Central States, the City of Fond du Lac, Wisconsin, water pollution control plant's (WPCP) discharge permit was recently reissued with an extremely low total phosphorus (TP) limit. The city currently uses chemical addition to remove TP from the WPCP discharge. This method of treatment meets the current effluent TP limit of 1.0 mg/L, however, the new regulations require a TP water quality-based effluent limit (WQBEL) of 0.04 mg/L, one of the lowest limits in the state. Even with source reduction and treatment optimization, the WPCP is not able to meet

the proposed WQBEL. Therefore, the city is currently completing a study of feasible alternatives to evaluate the compliance options available to achieve the WQBEL, including advanced TP removal technologies, watershed adaptive management, water quality trading, and regulatory alternatives. As a part of this study, the city conducted a pilot study in the fall of 2013 with the CoMag® ballasted-flocculation system offered by Evoqua Water Technologies LLC.

COMAG® SYSTEM OVERVIEW

The CoMag® system is a high-rate clarification unit operation based on chemical

coagulation-flocculation and ballast. Coagulation and flocculation occur in the system reaction tanks (see Figure 1). The process uses miniscule particles of magnetite to ballast the inorganic flocs generated. Magnetite is a naturally occurring iron ore (Fe_3O_4), fully oxidized, inert, and non-abrasive. With a specific gravity of 5.2 and an affinity to be embedded inside the flocs through simple mixing (see Figure 2) – due to its hydrophobic properties – magnetite has been shown to significantly increase settling rates. Due to its ferromagnetic properties, magnetite recovery rates have been shown, through the use of magnets installed in the waste line, to be as high as 99 percent. The CoMag® system also recycles settled solids from the clarifier to the reaction tanks in an effort to improve solids removal and provide more efficient chemical use.

Depending on the plant's hydraulic profile, influent to the CoMag® system can either be pumped or flow by gravity. The system is capable of operating with commonly used coagulants and has been shown to work well in multiple clarifier configurations, including cone, circular, and rectangular designs. The CoMag® system has proven to meet ultra-low TP limits in full-scale installations in several northeastern states, with the first facility in operation since 2007.

PILOT STUDY EXPERIMENTAL DESIGN

The Fond du Lac WPCP pilot study was conducted using the Evoqua 50-gpm CoMag® trailer mounted skid (see Figure 3). The goal of the pilot study was to demonstrate that a TP effluent limit of 0.04 mg/L could be con-



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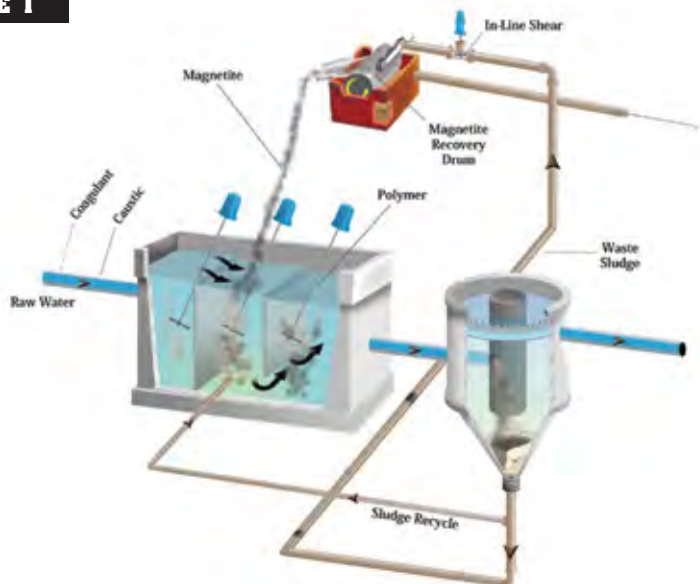
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FIGURE 1**Figure 1**

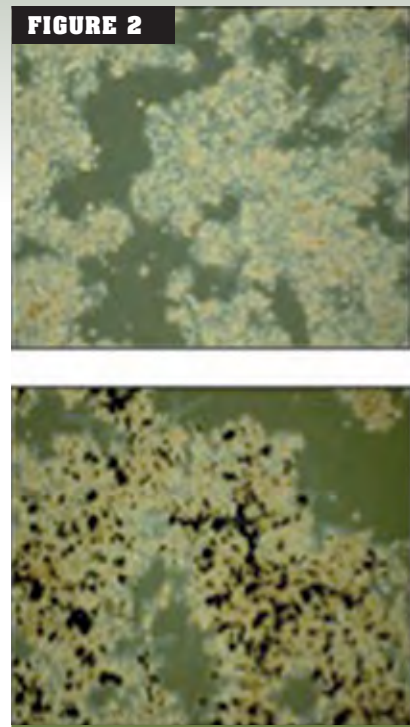
CoMag® system conceptual process configuration. Image provided by Evoqua Water Technologies LLC.

Figure 2

Flocs with no ballast (top) and ballasted flocs infused with magnetite (bottom). Image provided by Evoqua Water Technologies.

Figure 3

CoMag® pilot trailer on site at the Fond du Lac WPCP.

FIGURE 3

sistently achieved using the CoMag® system. The pilot processed effluent taken directly from the launder of a secondary clarifier. Coagulant was introduced prior to the first reaction tank, which was a conventional coagulation tank where pH was monitored and controlled when necessary. Caustic addition was not necessary for this study. Coagulant dose was controlled by a PLC and confirmed by measuring chemical draw-down rates from a calibration column.

Coagulation tank effluent then flowed to the second and third reaction tanks. These two tanks were separated by an underflow baffle. Recovered magnetite and polymer were added to the second and third tanks, respectively. Each tank had a stainless steel mixer with a VFD-driven motor to adjust the speed to ensure the proper amount of mixing energy. The wastewater then flowed into the 54-inch diameter (15.9 ft² surface

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Parameter	Pilot Sample Location	Alum	Ferric Chloride	PACI
TP (mg/L)	Influent	1.0	1.0	0.9
	Effluent	0.039	0.025	0.036
TSS (mg/L)	Influent	28.9	19.3	25.1
	Effluent	1.6	1.9	3.2
Turbidity (NTU)	Influent	NM	NM	NM
	Effluent	0.24	0.29	0.17
UV Transmittance (%)	Influent	67.5	65.1	67.4
	Effluent	76.0	75.1	79.0
NM = not measured				

Table 1

Average values measured during pilot study for three different coagulants. Note the average values include both the hydraulic and solids stress test values. Analysis provided by Evoqua Water Technologies LLC and the City of Fond du Lac.

area), 8-foot deep clarifier with a 60 degree cone bottom.

A sludge recycle pump returned settled sludge to the magnetite reaction tank at approximately 20 percent of the incoming flow. Waste sludge was pumped through the shear mixer and then to the magnetite recovery drum. The drum was used to recover magnetite in the waste sludge and return it back into the magnetite reaction tank. Typical wasting rates were 2 to 4 percent of the incoming flow.

Tests were conducted using three coagulants: aluminum sulfate (alum), ferric chloride, and polyaluminum chloride (PACI). Each coagulant was run for a period of approximately seven days. The first day or two of each run was used to develop a dose response curve for the respective coagulant and to optimize polymer dosing. The system was then run at steady-state for about three

days. After the steady-state test, a stress test was completed for each coagulant. The stress tests involved four hours of high flow followed by four hours of high total suspended solids (TSS) load. The high flow simulation was completed by increasing the pilot influent flow from 50 gpm to 100 gpm. The high solids simulation was completed by pumping MLSS from the aeration tanks into the pilot system to simulate influent TSS concentrations of approximately 100-120 mg/L.

Grab samples were taken daily throughout the pilot test from the pilot influent and pilot effluent to form an influent and effluent composite sample. The grab samples and composites were analyzed daily by Evoqua for TP, TSS, pH, and turbidity. Evoqua also recorded the amount of coagulant and polymer used and the amount of sludge produced. A split sample of the daily composites was provided to the WPCP lab and analyzed

for TP, TSS, BOD, fecal coliforms, and ultra-violet (UV) transmittance. Periodic samples were also sent to an outside certified laboratory for analysis of TP, ortho-phosphate, soluble nonreactive phosphorus, and metals.

RESULTS

The average daily flow to the WPCP during the pilot tests was approximately 8.0 MGD. Throughout the course of the pilot, approximately 300 gallons per day (gpd) of alum was added to the primary clarifiers, and approximately 200 gpd of alum was added to the effluent of the aeration tanks. Therefore, the results obtained from the pilot represent CoMag® performance following multi-point chemical addition.

The average TP, TSS, turbidity, and UV transmittance values measured during the testing period for each coagulant are provided in Table 1. It should be noted that these averages include the hydraulic and solids stress test values. Furthermore, these average concentrations also include values measured during the development of the dose response curves. The coagulant concentration was purposely varied from an overdose condition to an underdose condition to identify the optimum coagulant dose to meet a less than 0.04 mg/L effluent TP limit. The optimum coagulant and polymer dose was determined using a target effluent concentration of 0.03 mg/L. The chemical requirements for each coagulant to meet this target are provided in Table 2.

Even with the stress tests and variation in coagulant doses, each coagulant was able to achieve an average effluent TP concentration of less than 0.04 mg/L. Each coagulant also demonstrated significant decreases in TSS, with average reductions of 94.5 percent, 90.2 percent, and 87.3 percent for alum, ferric chloride, and PACI, respectively. Other results from the pilot study were as follows:



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Team Coagulant	Chemical	Chemical Requirement
Alum	Alum	12 mg/L as Al
	Polymer	0.70 mg/L dry weight
Ferric Chloride	FeCl ₃	24 mg/L as Fe
	Polymer	0.80 mg/L dry weight
PACI	PACI	20 mg/L as Al
	Polymer	0.70 mg/L dry weight

Table 2 Pilot study chemical requirements to meet a 0.04 mg/L TP effluent limit.

- The average effluent turbidity measurements were less than 0.30 for each coagulant.
- Each coagulant demonstrated an average BOD reduction of at least 74 percent.
- Each coagulant demonstrated an average increase in UV transmittance of at least 13 percent.
- Ferric chloride and PACI demonstrated a reduction in fecal coliforms of 99.7 percent (no fecal coliform tests were performed during the alum analysis).

CONCLUSIONS

Overall, the results of the pilot test indicate that at a pilot scale, the CoMag®

system is able to consistently treat secondary effluent to a TP effluent concentration of less than 0.04 mg/L with any of the three coagulants tested. Turbidity, TSS concentrations, and UV transmittance results were consistently similar to water quality obtainable from advanced tertiary filtration. The information obtained from the pilot tests (chemical use, sludge production, etc.) will be used to update the budgetary costs for a full-scale implementation of the CoMag® system. The preliminary budgetary cost for full-scale CoMag® at the Fond du Lac WPCP is \$130 per pound TP removal.

For more information, please contact Jeremy Bril at jeremy.bril@strand.com. [CS](#)

“The results of the pilot-test indicate that at a pilot scale, the CoMag® system is able to consistently treat secondary effluent concentration of less than 0.04 mg/L with any of the three coagulants tested.”

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Assessment of available technologies for sewage heat recovery in a collection system

Michael Harvey, PE, Donohue and Associates

In the last 20 years, energy costs and societal pressure for greater energy conservation and sustainability have increased. The changes have affected many aspects of day-to-day lifestyles. Today we have an array of consumer products designed to be more energy efficient. Perhaps an obvious example is our personal means of transportation; not only are today's vehicles far more fuel efficient, but other forms of transportation are becoming more popular. Even the bicycle has made a resurgence, especially in downtown city environments. These changes are being driven by consumer choice and new government regulations written in response to societal pressures and the realism that our appetite for energy must change if our futures are to be sustainable.

Likewise, in the wastewater industry, there are ever-increasing demands to conserve energy. Pressures from constituents, along with budget challenges, are at the root of the changes in municipal government. As revenues stay flat or even decline, operating costs are going up, with increasing energy costs being one of the main reasons. For most municipalities and sanitary districts energy constitutes one of the, if not the, largest part of operational expenses. Over the last 20 years there has been a significant amount of work undertaken by local governments to address their energy consumption. WEF's Energy Road Map is just one of the examples of the many documents written to provide guidance to the industry. In North America most of the focus for the wastewater industry has been on water reclamation facilities, which due to pumping and aeration, have a large energy demand. However, there is an increasing interest in recovering heat from wastewater collection systems where sewage temperatures are typically between 55 and 75 degrees F. The heat

represents wasted energy, the water has been heated while it was used in the building and then discharged to the sewer. The objective is to capture the energy and in recovering it to heat buildings.

This article explores:

- The current technologies available for heat recovery in a collection system and discusses the pros and cons of each.
- Examples of where technologies are being utilized and discusses the lessons learned.
- The challenges of retrofitting systems into an existing collection system.

A number of specific manufacturer's systems are reviewed and discussed based on a search of available products. The intent of this article is to explain what is available, but not endorse any specific product. A total of four different manufacturers and their available systems were evaluated. Each system has the same general principle, the heat is recovered by transfer of heat from the flowing sewage and then extraction of the heat through heat pumps. Each of the manufacturers has a website with additional product details, design criteria and case studies.

The available technologies fall into two distinct types:

- Wet well, modular systems.
- Inline sewer systems.

Wet well (modular) systems – these systems utilize a separate wet well or chamber next to the sewer and can either be retrofitted into an existing sewer system or built as a part of a new system, as shown in Figure 1. Two systems were found, ThermWin by Huber Technologies and SHARC by International Water Systems. The latter, which is based in Canada, was the only non-European manufacturer of any of the technologies reviewed.



Schematic Drawing of Typical ThermWin System

Figure 1: ThermWin Wet well (modular) system configuration.

As can be seen, the wastewater flows into a wet well chamber next to the sewer where it is screened through Huber's ROTAMATROK4 screening system and pumped through Huber's RoWin heat exchanger before being returned to the sewer.

Likewise the SHARC system, shown diagrammatically in Figure 2, uses a similar approach as the ThermWin system. The modular systems have the advantage of having a small footprint, which might make retrofitting them into an urban environment easier than the inline systems. Among the disadvantages are the need to handle screenings locally and also the increased maintenance due to more mechanical equipment than the inline systems.

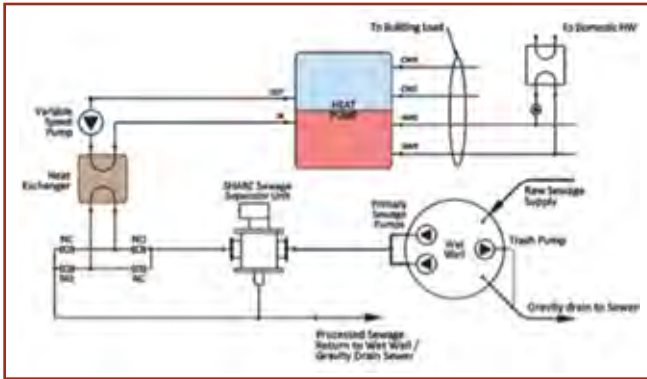


Figure 2: SHARC wet well system diagram.

Inline sewer systems – these systems use a heat exchange system that is built into sections of pipe. For new installation, the heat exchange pipe can be incorporated into the pipe wall, whereas for retrofit situations the heat exchange system is incorporated into the invert of an existing pipe. Three manufacturers were found: Huber Technologies (TubeWin), Rabtherm Energy Systems (Rabtherm Systems – there are two options, one for new construction and one for retrofitting) and Frank Der Vorsprung (PKS Therm Pipe). Although all three use a similar concept, they are distinctly different.

TubeWin is shown in Figure 3. This was one of two systems reviewed that can be retrofitted into an existing sewer pipe. The heat exchange pipes come in 4.25-foot invert filler sections that are grouted into the pipe's invert. From 15 to 75 sections can be combined to create a system. The main drawback of the system

is that it reduces the cross-sectional area of the pipe so the viability of the installation needs to take into consideration the loss in hydraulic capacity.

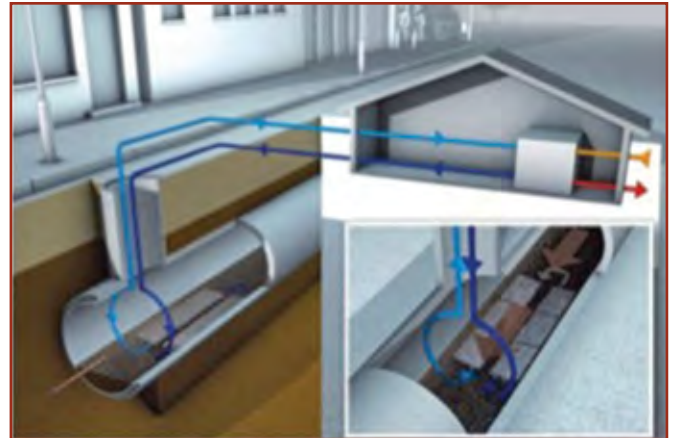


Figure 3: TubeWin inline heat exchanger system.

Rabtherm System has two options, one for new pipe installations (Series I) and one for retrofitting in existing pipes (Series E).



Figure 4: Rabtherm Series I pipe for new installations.

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The Series I system has the heat exchange pipes incorporated into the pipe wall and sections can be connected together to create a system. The Series E consists of sections that are incorporated into the invert of the existing pipe, similar to the Huber TubeWin System discussed above.

The PKS Therm Pipe system is a little different than the other concepts because the heat exchange pipe is wound around the exterior of the pipe. This has the benefit of not only providing heat transfer from the wastewater, but also from the ground and becomes a dual sewage/geothermal system.

Throughout Europe there are numerous examples of installations, and each of the manufacturers features projects on its website. North American examples are in Canada. In the US there are a number of examples of heat recovery from wastewater within the water reclamation facility, but none currently in operation in the collection system. The following installations were selected to give an example of the types of installations and the scale of the applications.

Stuttgart Ministry Building – The new ministry building was constructed in 2012 on a site in the center of Stuttgart. Next to the site is an existing sewer, which was used to provide both heating and cooling of the new building. The system utilizes the Huber ThermWin system. Two heat exchangers and three heat pumps maintain a comfortable climate for 610 employees.



Figure 6: Central facility control room with wastewater shaft (RoK 4 in tank) and wastewater heat exchanger in the background.

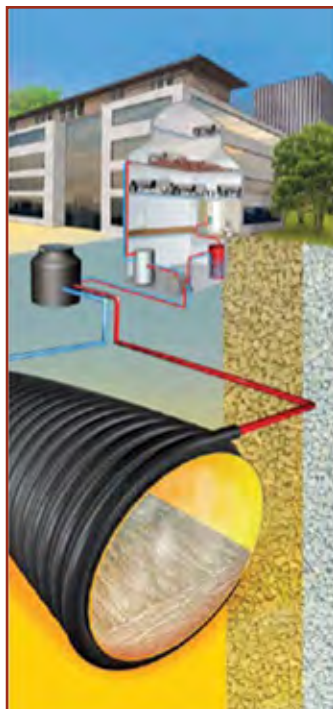


Figure 5: PKS Thermpipe.

A significant project in Canada is the Southeast False Creek Village. This residential district-heating project was originally constructed as the athletes' village for the 2010 Winter Olympics. Although that was the original use, like many Olympic developments, it was constructed with a long-term use as a housing development in Vancouver. The system utilizes the SHARC technology. The original cost was \$29 million. The village operates as a neighborhood energy utility and is now self funded. About 70% of the village's heat is recovered from the wastewater. Supplemental heating to address the total heat load is provided by natural gas.

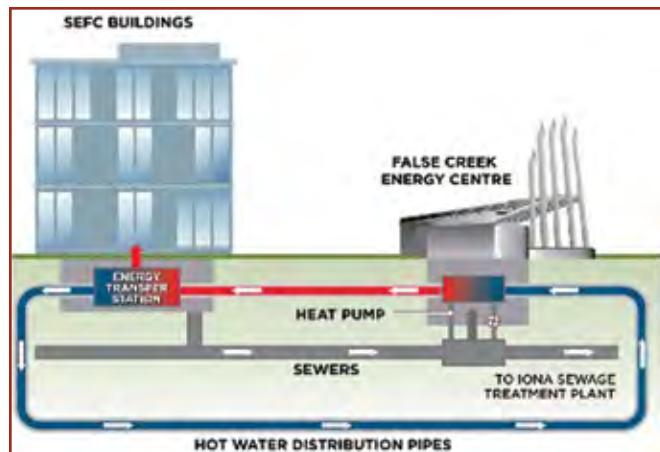


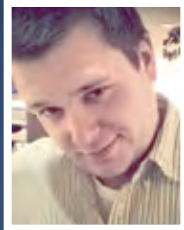
Figure 7: Schematic of Southeast False Creek Village heating system.

In conclusion, this review has provided a number of technology options and given some of the pros and cons. There are substantial opportunities to incorporate heat recovery and cooling into wastewater collection systems but there are a number of challenges in doing so in an existing system. One challenge is finding a suitable building or development that can benefit from the new facility. Typically the building needs to be within a reasonable distance (less than 200 yards) of a larger sewer. Universities and hospitals make attractive opportunities since they are condensed and often have existing campus district heating systems. The configuration of the sewer, such as depth and accessibility, will dictate which technologies are even practical. The wet well modular systems are much more attractive because of their small footprint, but these systems have a higher capital cost, are more complicated and require more maintenance. Payback alone may not justify the project. Although some paybacks of less than 10 years are reported, 10 to 20 years is more realistic. In which case, the project will have to be justified on grounds beyond just economics. Using a triple bottom line approach, in which social and environmental issues are incorporated into an objective analysis along with economics, might well help to provide the justification necessary.

Mr. Harvey is a vice president in the Chicago office of Donohue and Associates. The article was developed from a presentation made at the 2014 WaterCon and Central States WEA annual conferences. Some of the research was developed from a project undertaken by the Milwaukee Metropolitan Sewerage District. CS



Matthew
FUESTON



Sara
BREITZMAN



Sarah
WALSH



Andrea
DUNN



Student Design Competition Winner: **WASTEWATER**

A Marquette University Civil Engineering Senior Design Group, consisting of Sara Breitzman, Andrea Dunn, Matthew Fueston, and Sarah Walsh, participated in the Central States Water Environment Association/Water Environment Federation Student Design Competition, held in Madison, Wisconsin on April 7, 2014. Under the faculty mentorship of Dr. Daniel Zitomer of Marquette University, the group pursued solutions to a unique problem statement: “How can biosolids management in Southeastern Wisconsin become more sustainable?”

Biosolids are a historically underutilized resource with great potential. As municipalities continue to grow, there is a developing need for a more sustainable approach to handling and recovering resources from biosolids. While land application may be one current, convenient method, future phosphorus regulation limits may make it more costly to land apply biosolids. Landfill disposal also prevents usable byproducts from being captured. The Marquette University Senior Design Group decided a more sustainable solution that decreased the volume of biosolids and provided usable end products would be the project goal.

The first step for the design team was to define the SEWRPC region (Milwaukee, Ozaukee, Walworth, Waukesha, Washington, Racine and Kenosha counties) as the target area for research. The team then reached out to Wastewater Treatment Plants (WWTPs) in the target area in order to gauge the general industry. What processes were currently being used in biosolids management? What do WWTP operators see in the future of biosolids with respect to technology and management practices?

Through feedback from operators, discussion, and research, the project team determined two main points of interest to focus their attention upon: biosolids volume reduction and phosphorous removal. Volume reduction is important now and will be imperative in the future. As the population grows, so will the land requirement for disposing an increased amount of biosolids. Phosphorous removal is equally important due to the environmental implications of nutrient runoff on waterways. Current and future regulations regarding limits on both phosphorous in land application and WWTP effluent will require heavy capital investment from municipalities or sanitary services – investments that smaller communities will not be able to make without large government subsidies. To find a sustainable solution, the design team examined options that would provide both volume reduction and phosphorous removal on an economical scale. These constraints, along with factors regarding technology selection and process end products, gave the group a great deal of alternatives to analyze.

The project team determined three general scenarios with which to build alternative designs. The first option examined the feasibility of doing nothing and simply continuing current biosolids management practices. The feedback from WWTPs was considered in the second design, resulting in an alternative that produced a marketable byproduct at the end of processing. This situation was interesting but did not address future phosphorous regulations. The final alternative combined high quality biosolids production with thermal processing and phosphorous removal to provide the most feasible, sustainable solution. The group decided the third alternative would be best as it met the original criteria, considered WWTP operator feedback, created a marketable end product, and had the added possibility of energy capture and production.

A preliminary design consisted of a layout for a Southeast Wisconsin Regional Resource Reclamation Facility (SWRRRF) – a sustainable biosolids handling facility with the tagline “Turning Waste into Wealth While Preserving Health.”

A 3D representation of the Southeastern Wisconsin Regional Resource Recovery Facility



The preliminary design consists of tanker trucks delivering biosolids of varying states (digested, undigested, dried cake solids, codigestates) to the regional facility and offloading them to appropriate process headworks based on their state. Undigested biosolids are sent to an anaerobic digester to reduce volume and produce useful digester gas. After a number of days, the digested solids are pumped to a dewatering system to partially separate liquids from solids. The solids move on to a drying process, while the liquids proceed to a phosphorous removal system. After drying, the solids are subjected to a thermal conversion process that pulls as much useful energy from the material as possible. The final byproduct of the thermal conversion process can then be marketed. The preliminary design is flexible enough that the material from any of the end processes can also be sold since the products are more uniform and of higher quality of their predecessors.

There were many different options for each of the processes of the preliminary design, and each alternative was thoroughly scrutinized to meet the goals of sustainability and economic

feasibility. After analyzing various dewatering, drying, thermal conversion, and phosphorous removal technologies, the team developed a final design plan. The received biosolids are anaerobically digested or added to the dewatering or drying stages upon their delivery based on their state. In dewatering, liquids are separated from the solids using a rotary fan press. The excess liquid is sent to phosphorous removal processing to remove struvite (a phosphate precipitate), and the solids are sent to a rotary drum dryer. Any excess water from the solids is removed and the solids are turned into Class A biosolids through this method of drying. The dried solids are then processed via slow pyrolysis (burning of solids in the absence of oxygen) resulting in the byproducts of biochar and pygas. The Class A biosolids, struvite, and biochar can be marketed, and the pygas can also be burned to produce energy if properly processed.

There are many benefits to the regional facility. Disposal costs of biosolids would be lower compared to the traditional method of landfilling or contracting the disposal to a sanitary service.

The regional plant would comply with current and future phosphorous biosolids and effluent regulations, resulting in a long-term, cost-effective resolution. Energy generated from biogas in the production of marketable byproducts also creates a revenue-generating stream that if processed correctly could also result in energy production.

The team was selected for First Place in the Wastewater Treatment Design Category, and will be competing at the national level design competition event administered by WEFTEC in New Orleans, Louisiana in September 2014. There is still much work to do regarding areas such as construction details and equipment costs (currently the facility has an estimated cost of \$5.86M and a 226 day construction schedule). The interdisciplinary project team will be working diligently throughout the summer to prepare for the competition. They hope to generate more interest in the field of sustainable water use and water resource technologies, and help propel Marquette University to the forefront of this essential and uniquely local opportunity. [CS](#)



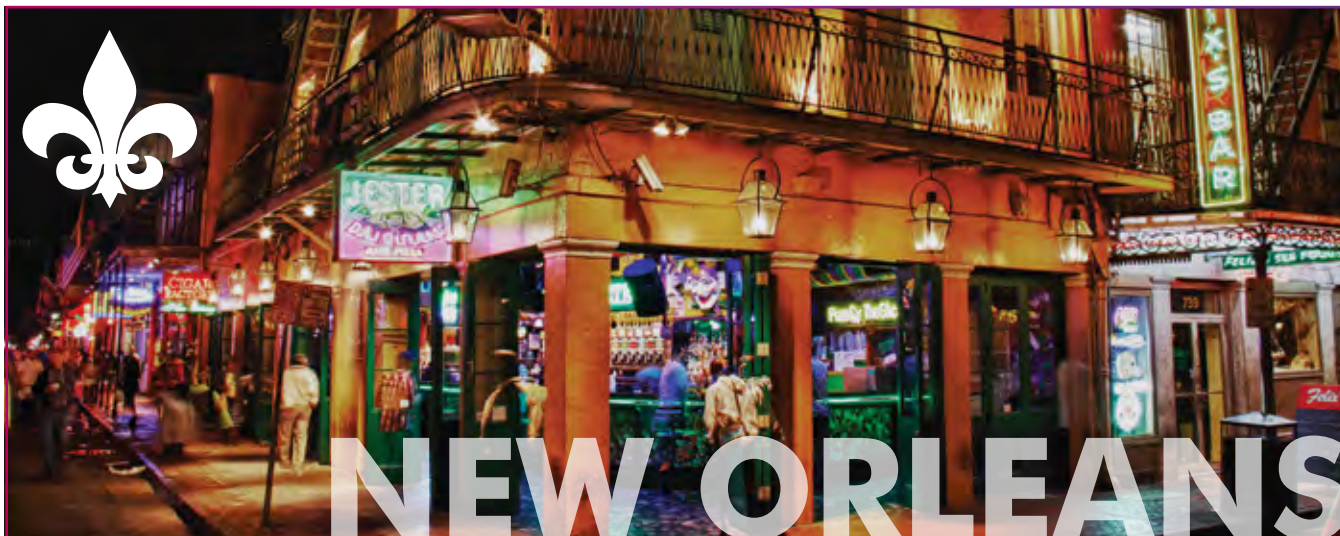
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Neumann and Moynan putting fish in the testing tank



MINNESOTA

Christine Neumann and Crystal Moynan
What effect does gender, tone, and sound location have on the response behavior of Neogobius melanostomus (Round Goby) and the possibility of future trapping of this invasive species in Lake Superior?
 Cloquet Senior High School;
Science Teacher: Cynthia Welsh
 Sponsored by the Central States Water Environment Association

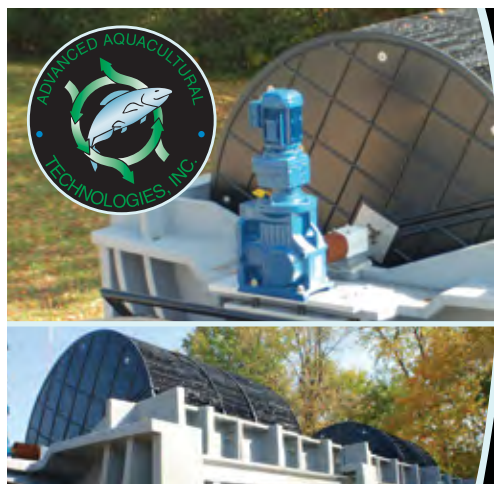
WISCONSIN

Alex Booton and Cameron Palmer
Utilizing Graphene as a Method of Desalination Muskego High School;
Science Teacher: Karen Lindholm-Rynkiewicz. Sponsored by the Central States Water Environment Association

From left to right, Cloquet sophomores **Christine Neumann** and **Crystal Moynan** both received the Minnesota Stockholm Junior Waterprize's first place research paper award. Theirs was the one research paper chosen for this award from the Central States Water Environment Association (CSWEA-MN).

ILLINOIS

Struti Mohan
The Effect of Biochar on Water Filtration Neuqua Valley;
Science Teacher: Jacklyn Naughton
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MN WINNERS

Crystal Moynan and Christine Neumann, both Cloquet High School sophomores, submitted their water-related research paper and were selected by the Central States Water Environment Association's Minnesota Chapter as the BEST (first place) Minnesota 2014 State Stockholm Junior Water Prize submission. They will represent Minnesota at the National Stockholm Junior Water Prize, June 13-14, in Herndon, Virginia, with a chance to present their work at the International Stockholm Junior Water Prize in Stockholm, Sweden in August 2014.

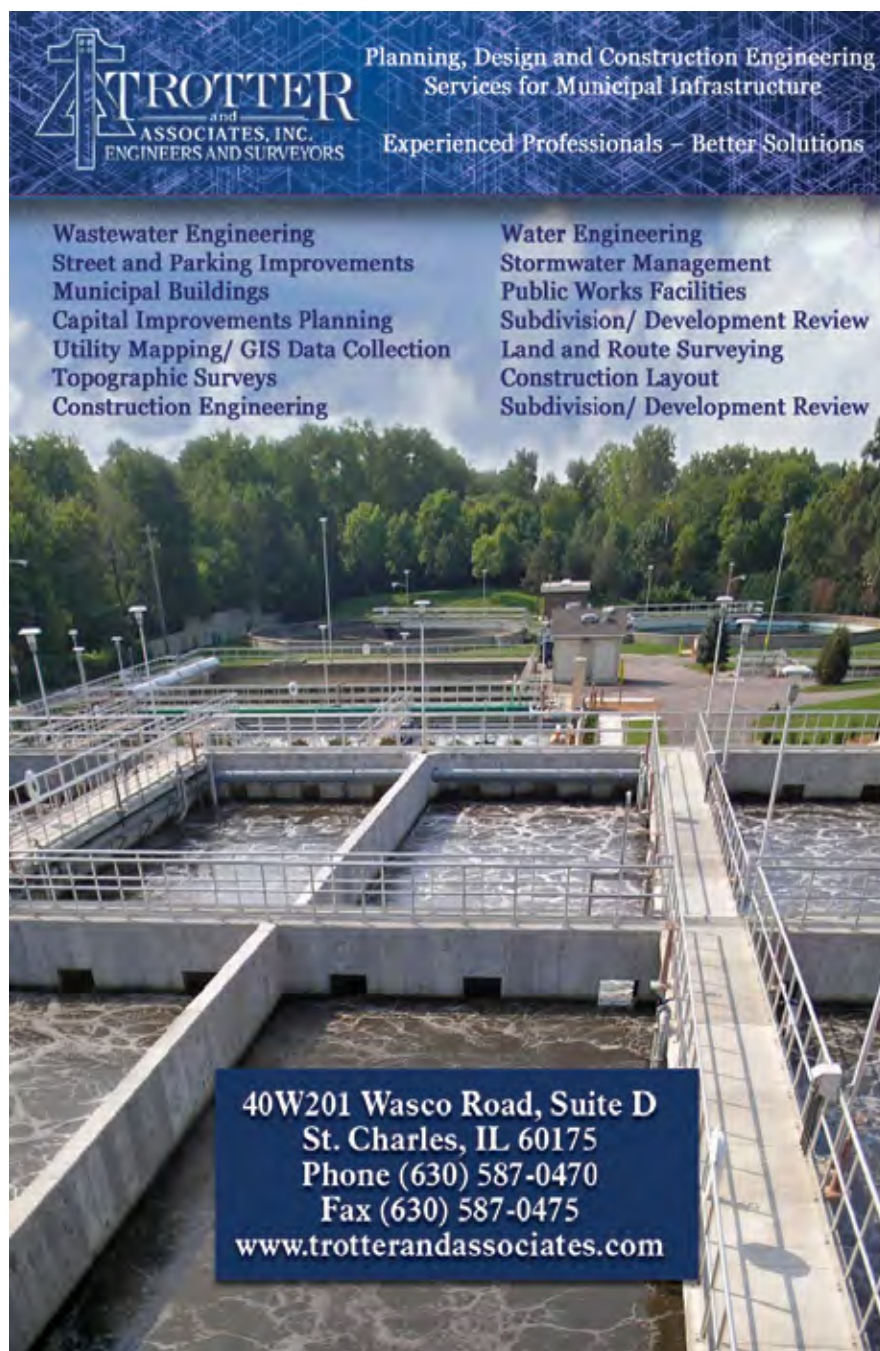
Moynan and Neumann's award-winning paper/project is titled *What effect does gender, tone, and sound location have on the response behavior of Neogobius melanostomus (Round Gobies) and the possibility of future trapping of this invasive species*. They were given professional assistance from Brooke Vetter, a University of Minnesota Duluth (UMD) biology graduate student working on her PhD, and Dr. Robert Lloyd, psychology professor at UMD. Both Moynan and Neumann were mentored by Cloquet science teacher, Dr. Cynthia Welsh.

Round Goby are an invasive species of fish found in the Great Lakes, originally found in regions near the Black and Caspian Sea, and transported by ship around 1990 in the ballast water of cargo ships. The goby prey on lake trout eggs, a primary Lake Superior recreational fish, and fry, and may feed on the fry and eggs of other species (French and Jude, 2001). Moynan and Neumann's novel study was done to determine if a tone that mimics the frequency (175 hertz) of a male round goby's (*Neogobius melanostomus*) mating call would have an effect on male and female response. After observing and remotely recording the behavior, they found that females spent more time and went into the minnow trap on the speaker side of the tank (175 Hz) and males avoided the speaker side (175 Hz) and minnow trap. Thus, using a tone at the frequency of the male mating call appears to be a feasible non-invasive control/removal method.

These students had financial support for their projects from Cloquet Public Schools, the Cloquet Educational Foundation, and were funded in part by the Minnesota Power Foundation. With special assistance from Holly Pellerin, director of the Manoomin Project, funded through the National Science Foundation and the University of Minnesota's Geoscience Alliance's Diversity Director Diana Dalbotten and Emi Ito.

WI WINNER

Alex Booton and Cameron Palmer, students at Muskego High School in Muskego, WI, have been named the state winners of the 2014 Stockholm Junior Water Prize (SJWP) competition, the most prestigious youth award for a water-related science project. Selected for their project, *Clearwater S: Utilizing Graphene as a Method of Water Desalination*. CS



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Taming Biological Phosphorus Removal Effluent P-Spikes

Jared Greeno, City of LaCrosse,
Greg Paul, QLF, David Roskovic, ASA Analytics

INTRODUCTION

Wisconsin's NPDES effluent phosphorus (P) limitations are in the process of becoming more stringent. This is driving utilities to explore reliable and economical options for treating P. EPA reports when treating to achieve low concentrations of P, facilities using *enhanced biological nutrient removal* significantly reduced the amount of P to be removed through the subsequent chemical addition and tertiary filtration process. This improves the efficiency of the tertiary process and can significantly reduce the costs of chemicals used to remove P; however, the stability and reliability of biological phosphorus removal (BPR) can be problematic. It is widely known that BPR plants experience process upsets, deterioration in performance and even failures.

A number of BPRs instability and reliability issues can be traced to the fact it is a dynamic biological system which reacts fairly quickly to changes in the influent rbCOD:TP. The biological health of a well-designed BPR system and level of its performance is specifically reliant on having an influent rbCOD:TP ratio that satisfies rbCOD demand for the level of Dissolved Reactive Phosphorus (DRP) treatment desired. The amount of instantaneous variations in rbCOD demand is plant specific.

There are numerous causes for performance instability related to not satisfying the instantaneous rbCOD demand. Some of these conditions include periodic lack of influent rbCOD, changing levels of nitrates in RAS, changing dissolved oxygen (D.O.) in the RAS and intermittent internal side stream shock loads of P and/or N.

In all of these conditions feeding rbCOD can correct the performance issues but it is difficult to *know when and how much to feed*. The BPR instantaneous rbCOD demand changes hourly or even as often as every 15 minutes, especially for systems with heavy industrial loadings and/or with intermittent side streams containing high concentrations of P and/or N. The rbCOD demand changes also from day to day for those systems treating influent waste that contains a high percentage industrial rbCOD waste. Historically some operators have used additional rbCOD to supplement the BPR reaction and have fed it steady or at a manual variable rate.

This study explores an option of solving BPR performance instability issues caused by not meeting the changing instantaneous rbCOD demand. First, it establishes a *simple* method to measure the BPR's rbCOD demand status and then designs and trials an automatic system which instantaneously measures the

BPR rbCOD demand status and then responds to the demand status by feeding varying amounts of EnhanceBio^{P+N}, a source of high strength rbCOD, when required.

Establish a simple method to measure BPR rbCOD demand status

The first part of the study was to establish a simple method to measure whether the BPR is being feed enough rbCOD to satisfy the BPR instantaneous rbCOD demand. Several BPR systems were field tested using the orthophosphorus nutrient profile (OPNP) method to become familiar with the biological reactions happening within various BPR systems. Next the data was evaluated and reference materials were consulted to relate the results to what others have learned.

Field testing – Four Wisconsin facilities were field tested using the OPNP method. It became apparent after reviewing these results that all the systems behaved very similarly. The P-release in the anaerobic zones and the P-uptake rates in the aerobic zones all changed as the rbCOD and P loadings changed. These changes happened at least every hour (or less depending on BPR system) and also from day to day especially when comparing weekday to weekend changes in loading.

Mathematical expression needed – Meeting rbCOD demand is essential for good BPR performance. So a method to measure rbCOD demand status is vital. A mathematical expression representing the rbCOD demand status needed to be established as a baseline. In reviewing field test data and reference materials it became clear the P-Release in an anaerobic zone varied based on rbCOD and P loading to the zone. For this study a ratio was established, **Anaerobic Zone P-Release divided by BPR Influent P**. It will be referred to as **Phosphorus Release Ratio** or **PR²**. The question is can PR² be used to measure the rbCOD demand status which would provide the tool to track and control the health and performance of a BPR system? The data collected and analyzed from field testing is used to answer this question.

Observations based on data collected

Here are some of the observations;

1. rbCOD addition, positively effects the P-release in anaerobic zone, driving the PR² up,
2. As a falling PR² approaches 1.5 the Aeration Tank Effluent PO₄-P (ATEP) starts to increase,
3. Letting the PR² decline below approximately 1.5 makes the system sensitive to significant increases in rbCOD.

There was an observed relationship between PR² and ATEP. As the PR² declines the ATEP concentration raises, resulting in declining quality and conversely as PR² raises the ATEP concentration drops, resulting in improved quality.

PR² measurement is established for BPR rbCOD demand status – The data provides enough evidence showing a relationship between PR² and the rbCOD demand status in the anaerobic zone. The data in turn shows there is a relationship between PR² and the ATEP quality and ultimately the BPR performance. Knowing the PR² levels corresponds with BPR performance the next logical step is to see if controlling PR² using an automated EnhanceBio^{P+N} feeding system will in turn control the ATEP quality.

Planning and setup for trial

In order to accomplish the study objective of operating a full scale automated supplemental rbCOD feeding system trial, the City of LaCrosse provided an A2/O BPR system, ASA provided their

ChemScan® on-line DRP and nitrate ($\text{NO}_3\text{-N}$) analyzer and QLF Specialty Products supplied EnhanceBio^{P+N®}, source of rbCOD.

BPR system used for trial – The City of LaCrosse's A2/O BPR system was designed by Dr. Clifford Randall of Virginia Tech in 1996. Long-term performance of this system shows an average effluent Total Phosphorus (TP) of approximately 0.7 mg/l. The daily effluent TP performance varies based on rbCOD loading from the local brewery and P and/or N internal side stream loadings. The effluent TP concentrations standard deviation was 0.5 mg/l. The BPR system, with good effluent TSS, can produce effluent TP below 0.3 mg/l for a number of days in a row, but it then spikes to 1.5 mg/l usually at the end of weekends and/or beginning of the week.

Online monitoring and sample points – ASA Analytics manufactures on-line analyzers for analysis of nutrients and a variety of other parameters. ASA Analytics' ChemScan® Model No. UV-4100 online analyzer was used for this study, see Figure 2. The analyzer used for the study had the ability to sample from two distinct sample points. This unit used in-situ cyclic filters on the sample lines which were connected directly to the analyzer. It drew samples every 15 minutes from each of the two sample points and analyzed the primary effluent sample for DRP and the AN-1 sample for DRP and $\text{NO}_3\text{-N}$. The primary effluent sample, see No. 1 in Figure 1, was drawn from a temporary 30-gallon plastic drum which the primary effluent was pumped through, see Figure 3. The AN-1 sample was drawn directly from the anaerobic tank, see No. 2 in Figure 1.

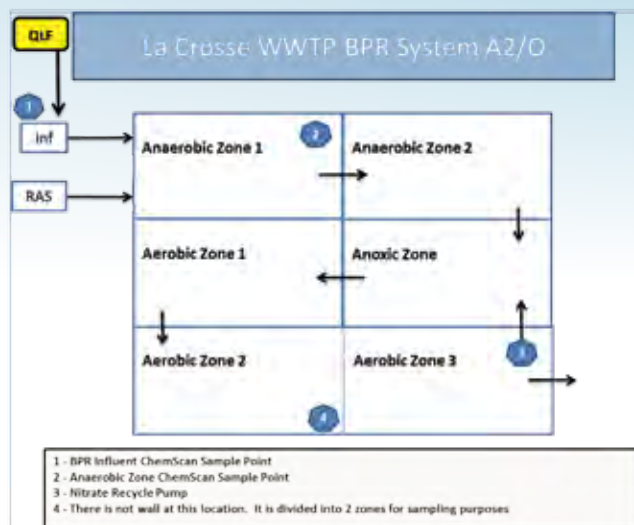


Figure 1

Source of rbCOD – QLF Specialty Products manufactures a product containing high levels of rbCOD. EnhanceBio^{P+N®} is a molasses blend product formulated to supply carbon, macronutrients, micronutrients, minerals and other ingredients for promoting microbial growth. The COD is 939,000 mg/l. EnhanceBio^{P+N®} was added to the primary effluent, just before going into anaerobic zone.

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Figure 2



Figure 3

Programming SCADA
– LaCrosse had LW Allen program the SCADA system to include three 4-20 mA input signals, primary effluent DRP, anaerobic zone 1 DRP and anaerobic zone 1 $\text{NO}_3\text{-N}$. The PR^2 was calculated in the PLC. The program provided feed pump start/stop points. These start/stop points were PR^2 levels. When the PR^2 went below the low level PR^2 set point the pump would start and operate using a ramp control with inputs set by operator. This ramp control regulating the speed of the EnhanceBio^{P+N} feed pump. The lower the PR^2 level went the greater the feed pump speed and the higher the PR^2 went the lower the feed pump

speed. When the PR^2 goes above the high level PR^2 set point the feed pump shut down.

Trial – Startup/troubleshooting/normal operation

The length of the trial was four weeks with a focus on the weekends because the changes in rbCOD loading to the La Crosse plant are the most dramatic then. During the weekdays the PR^2 start/stop set points were set higher so the system would not run as much because there is higher rbCOD loadings from the local brewery. It took three weekends to work out the bugs in the system. These included but were not limited to, accidentally letting the online analyzer reagent run out, running out of EnhanceBio^{P+N} late one weekend. The process of learning the best dose settings required a fair amount of trial/error time. On the fourth weekend everything came together and the process successfully achieved the study objective.

RESULTS

Successful trial

Figure 4 illustrates it is possible to automatically feed EnhanceBio^{P+N} to the anaerobic zone in a BPR system to achieve low and consistent effluent DRP. The successful trial was on the weekend of Friday 9-7-12 through Tuesday 9-11-12. The automated system kept the PR^2 at an average of 3.5 for the five day period. Every time the PR^2 started dropping down the EnhanceBio^{P+N} feed pump would turn on and ramp up or if it was already on it would ramp up. In reverse, as the PR^2 starts increasing the speed of feed pump would start to ramp down. The line at the bottom of the graph is the effluent on-line DRP analyzer results and it stayed relatively flat. The effluent daily composite TP, mg/l were as follows, Friday – 0.22, Saturday – 0.36, Sunday – 0.12, Monday – 0.21 and Tuesday – 0.24 for an average of 0.23 mg/l.

“The automated system kept the PR^2 at an average of 3.5 for the five day period. Every time the PR^2 started dropping down the EnhanceBio^{P+N} feed pump would turn on and ramp up or if it was already on it would ramp up.”

Benefits of automatically feeding EnhanceBio^{P+N}

This automated EnhanceBio^{P+N} feeding process covers a multiple BPR sins. As the anaerobic zone is faced with any one of the following conditions the PR^2 will start to decline and the automated feed system can respond in a timely fashion to prevent the BPR system from going bad.

- Nitrates in RAS or from side stream recycle ammonia spikes which nitrified in the system
- Oxygen in RAS
- P spikes in side stream recycle flows

Additional benefits are the system automatically senses when it has enough rbCOD and stops feeding, thereby feeding very economically. EnhanceBio^{P+N} also contains additional K^+ and Mg^+ to supplement any possible deficiency for these two critical BPR parameters.

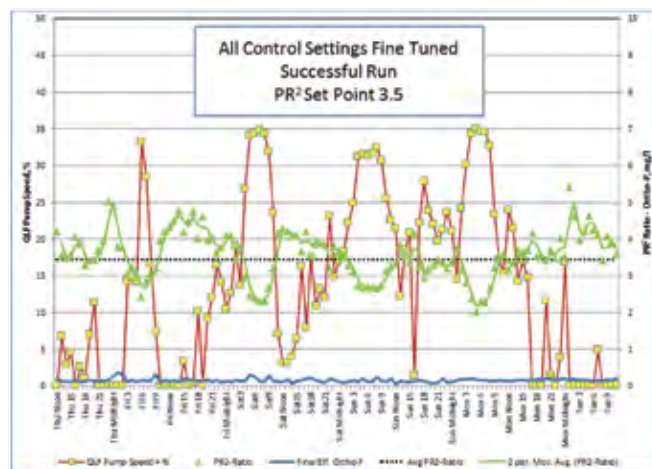


Figure 4

CONCLUSION

Spiking effluent TP is generally caused by periodic lack of influent rbCOD to satisfy the demand required to remove DRP. This study found it is possible to track the rbCOD demand status by measuring the BPR influent OP and anaerobic zone DRP and use these two values to calculate the P-Release Ratio (PR^2). PR^2 is a numerical gauge of the BPR system rbCOD demand status and can be used to track and control the BPR system's performance.

The combination of PR^2 on-line monitoring with the ChemScan® analyzer and the use of QLF's EnhanceBio^{P+N} as a source of rbCOD provided a near steady state rbCOD condition successfully regulating and maintaining the BPR reaction achieving low level effluent DRP.

The required PR^2 and EnhanceBio^{P+N} dosing levels will vary based on influent rbCOD deficiency, rbCOD demand created by the plant's side streams, system SRT, general BPR design and the required effluent levels of phosphorus and nitrogen. [CS](#)

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Madison MSD Launches Project

Madison Metropolitan
Sewerage District

Rain couldn't stop a parade of local and state leaders, as well as nutrient recovery experts, from pouring into Madison, Wisconsin on Wednesday, June 4 for the launch of a revolutionary project: the \$40 million 11th Addition to the Nine Springs Wastewater Treatment Plant (NSWWTP) for the Madison Metropolitan Sewerage District (MMSD).

The high-profile ceremony marked the official opening of the nutrient recovery facility constructed during the 11th Addition, which was designed by Applied Technologies, Inc. As part of the District's continuous improvement program, the facility will help protect area freshwater lakes and rivers by recovering phosphorus from wastewater streams at the plant and transforming it into an environmentally responsible fertilizer named Crystal Green®.

About the Plant

The NSWWTP is a 40-million gallon-per-day advanced wastewater treatment plant (WWTP). Wastewater generated within the District's 180-square mile service area is collected and treated at the NSWWTP and then discharged to Badfish and Badger Mill Creeks.

Treated biosolids from the NSWWTP are recycled to agricultural land through MMSD's successful Metrogro program. Under current waste loadings, the NSWWTP solids handling system processes approximately 100,000 lbs/day of solids, yielding the liquid Class B biosolids product for the Metrogro program. Before the 11th Addition Project, the District transported and applied about 40 million gallons of Metrogro on area farmland annually. Plant loading projections predicted that the solids handling system loadings would increase to more than 150,000 lbs/day by the year 2030.



Dane County Executive, Joe Parisi; Philip Abrary of Ostara; Robert F. Kennedy, Jr. of Ostara; MMSD Commission President, Caryl Terrell; MMSD Chief Engineer & Director, Michael Mucha; and Fredric Corrigan of Ostara

About the Project

All decisions made by the MMSD regarding its plant support the District's focus on sustainability: That decisions today are made so that life will be even better for future generations. The District has a long standing commitment to sustainability from protecting public health and the environment to managing community resources responsibly and cost effectively.

The 11th Addition focused on this belief as well. It was undertaken to support the District's goal of producing Class A biosolids. In order to achieve this designation, the existing anaerobic sludge digestion system was converted to a multi-stage acid phase digestion (mesophilic acid phase, thermophilic gas

phase). A second goal of the Project was to recover phosphorus from the treatment process in a useable form, thus turning a potential nuisance into an asset.

Struvite Harvesting

Uncontrolled struvite formation has long been a nuisance to wastewater treatment plants due to the maintenance headaches associated with its coating of piping, valves, and equipment. Struvite is a crystalline mineral composed of magnesium, ammonium and phosphate. MMSD, however, turned its struvite issue at Nine Springs into an asset with the 11th Addition Project, and has created an additional revenue stream. The struvite is harvested in the form of pellets, known as Crystal Green®, that can be sold on



WAS Thickening and Acid Digestion Facilities constructed during the 11th Addition Project



First Stage Thermophilic Methane Digesters



Acid Digesters

a commercial basis, since struvite is a desirable slow release fertilizer for agriculture. With worldwide natural deposits of phosphate dwindling, struvite is becoming a valuable source of fertilizer grade phosphorus.

Struvite harvesting at Nine Springs begins with the collection of filtrates produced during the thickening of waste activated and digested sludges. Filtrate is delivered to the Struvite Harvesting Building, where two upflow reactors (Ostara Pearl® 2000) extract the phosphorus in the form of struvite pellets. Magnesium chloride and sodium hydroxide are added to promote pellet formation. Struvite pellets are harvested from the reactors, dried, sorted, and bagged prior to shipping to commercial fertilizer blenders. At full future loadings, phosphorus recoveries up to 1,400 lbs per day (as P) are expected, which would translate to over 2,000 tons of struvite pellets per year, with a nutrient makeup of 5% N – 28% P – 0% K – 10% Mg.

Crystal Green® from MMSP's facility will soon be available to gardeners and homeowners in an all-purpose garden blend created by fertilizer blender Spring



Struvite Pellets are Bagged for Sale

Valley, located in Jackson, Wisconsin, and sold through local retailers. The Wisconsin fertilizer company has already committed to include the environmentally responsible fertilizer in a new garden blend product to be sold throughout wholesale and retail outlets. In the agriculture sector, Wisconsin farms are among a number of sites throughout the north and Pacific Northwest where Crystal Green® has been successfully used in grower trials on various crops including potatoes and fruit trees.

Ceremony

The June 4 ceremony marked the unveiling of this groundbreaking project, and further cemented MMSP's commitment to sustainability. The day began with facility tours lead by MMSP staff and the Applied Technologies project team. Attendees viewed firsthand the new processes at the treatment plant, including WAS Pretreatment for P-release, WAS thickening via gravity belt thickening, acid digestion, and struvite harvesting.

After the tour, attendees listened intently to remarks from Ostara CEO Phillip Abrary, MMSP Commission

President Caryl Terrel, MMSP Chief Engineer and Director Michael Mucha, and Dane County Executive Joe Parisi. Also in attendance was Robert F. Kennedy Jr., an Ostara Board Member and Keynote Speaker for the event.

"Our lakes and waterways contribute to our high quality of life – they are one of the main reasons people want to live, work, and play in Dane County," said Mr. Parisi. "It is imperative that we do all we can to keep our waterways clean. Today's event demonstrates the importance of adopting innovative technologies to make it happen."

As resources continue to dwindle, prices rise, and regulations tighten, the MMSP 11th Addition Project will no doubt remain the gold standard in an increasingly sustainable world! **CS**



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- Gregory Casimer
- Emily Gorsalitz
- Claudia Haack
- Ashley Hammerbeck
- Karen Harter
- Joe Heffron
- Steve Schick
- Manish Shrestha
- Chad Travnicek

March 2014

- Jason Fowler
- Tim Hewett
- Brandon Janes
- Emma Larson
- Shane Lund
- Benjamin O'Grady
- Rich Schici
- Mark Vanauken
- Lisa Vollbrecht
- Chris Yamaya

April 2014

- Dave Anderson
- Rick Behnke
- Travis Coenen
- Kevin Fischer
- Dianne Mathews
- Mark Morrison
- Kristy Neumann
- Glen Trickle

May 2014

- Steve Durocher
- Noah Johnson
- Jayme Klecker
- Shea Meyer
- Mike Murphy

June 2014

- Samantha Austin
- Ryan Hennessy
- Patrick Kirsop
- Louis Sigtermans

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Now is the Time to Become Involved

By Rich Hussey

It is amazing to see the progress that has occurred in the IL Section in regards to the active members, new committee chairs, successful local seminars planned, and the young professionals who have become key figures in the success of the IL Section. Previously serving as the IL Section YP Chair, eventually leading into the CSWEA YP Chair, one of the main focuses was to recruit and incorporate young talent into the organization. If you review the IL Section committee chair roster, you will see perfect examples on how this focus has placed so many young professionals into key roles. The perception of the past that it is difficult to chair committees as they were designated for the long-standing members can no longer be held. The IL Section has a rich past with very active and instrumental members but we are seeing emerging the new faces of Eric, Beth, and Scott.



The Annual Conference in St. Paul was a success. We had a very large IL contingency attending the conference. We were also able to get 12 of the IL members to attend Game 6 of the Blackhawks vs. Wild and bring home a victory, clinching the series. Patti and the MN LAC Committee should be commended for the Annual Conference as they prepared a top tier level experience for all who attended. The IL Section would also like to congratulate Matt Streicher and Carl Fisher for becoming new inductees to the 7S Society. It is well deserved! The Section would like also like to recognize Tim Tack as the 2014 recipient of the Arthur Sidney Bedell Award. Tim has served and provided great leadership for many years to CSWEA. His reflective articles about him holding his child and the future of water and wastewater are missed by many. Maybe we can get him to do a small write-up on a future publication.

In the spring message from the chair, Derek Wold, highlighted two upcoming events. The annual Illinois Section Collection System Seminar held on June 26 at Aurora University. This was a well-attended day seminar. Another seminar was TCON. This is a growing and emerging seminar to learn how technology can be applied to our business. It is well attended and we hope you consider it next year if you were not able to attend. We have a number of YP events being planned and if you are interested; I suggest you get into contact with James Kerrigan.

In the following year I encourage our members to become more active in the IL Section seminars and attend the various business meetings. We will most likely be setting up a future IL Section business meeting or social gathering in July. I would also like to see our members start bringing other colleagues to CSWEA and IL Section events. It is a very simple formula: the more active members bring greater resources to the organization which also brings additional opportunities to the various members. Most younger members and even non-members are not sure where they should start or how they could help. We need to encourage them (or do what Eric, Beth, and Scott did....drag them in) and demonstrate to them that the organization is searching for members to be active. We want members to be on committees or actively serve and we have a lot of members who will help guide or mentor them. If you are interested in learning more about the opportunities within the IL State Section, please contact me. We look forward to a great upcoming year and hope to see you at the events. CS

“The more active members bring greater resources to the organization which also brings additional opportunities to the various members.”



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Think. Do. Make a Difference

By Tracey Hodel

It is an honor and privilege to begin my tenure as Minnesota Section Chair. Thank you to Past Chair, Ms. Tracy Ekola for her service and leadership. She is an inspiration to all those who have the opportunity to work closely with her on Section activities. Tracy will continue to do a great job representing the Section and providing strong leadership for years to come.

Summer weather has officially arrived in central Minnesota. Over Memorial Day weekend, we hit the 80-degree mark for the first time since September 27, 2013. I was brainstorming over the past holiday weekend on what message to share and noticed a local billboard with the heading: THINK. DO. MAKE A DIFFERENCE. This is currently the motto for St. Cloud State University and it relays perfectly what makes the CSWEA successful. Every small action and/or contribution by our members truly does make a difference.

If you think you're too small to make a difference, you've obviously never been in bed with a mosquito. — Michelle Walker

Because of the effort put forth by many to make a difference, the 2014 Annual Meeting in St. Paul, Minnesota, May 12-15, was a huge success. Thank you for everyone who attended, participated, and coordinated this event. As a member of the Local Arrangements Committee and Technical Program Committee, we hope that you found this year's conference to be motivating, educational, inspiring and above all, fun.

Several new ideas and changes were incorporated into the conference. This included: utility registration rates and the addition of a fourth operator track to improve operator and utility manager attendance. In addition, ethics and leadership breakout sessions were added to the technical program.

The association's strategic goals and new ideas are discussed at the annual Central States Exchange (CSX) that occurs every July in Wisconsin. It is the perfect way for members to THINK. DO. MAKE A DIFFERENCE. The ideas and enthusiasm from this event really does create the momentum to try new things in an effort to have meaningful changes that make a difference.

Enthusiasm is that kindling spark which marks the difference between the leaders in every activity and the laggards who put in just enough to get by. — Unknown

The 2014 CSX will be held July 16-17 at the Kalahari Resort in Wisconsin Dells. I strongly encourage any member that is interested in learning more about the organization and those excited about making a difference attend this meeting.

As the Minnesota Section and as members of CSWEA, we need a creative, dedicated and enthusiastic group of volunteers to make meaningful improvements. I hope the following inspires you to THINK. DO. MAKE A DIFFERENCE.



HOW TO MAKE A DIFFERENCE

1. IT NEED NOT BE AN ENORMOUS TASK.

"If you can't feed a hundred people, then feed just one."

— Mother Teresa

Making a difference to the world may seem like an enormous task, but it is in fact the collective effort of everyone to make small contributions with a lot of heart.

2. START NOW.

"How wonderful it is that nobody need wait a single

moment before starting to improve the world." — Anne Frank

There is no one best time to start to make a difference to the world. Little efforts count, and you can start making small contributions today.

3. YOUR CONTRIBUTION IS NEVER TOO SMALL.

"Nobody can do everything, but everyone can do something." — Author Unknown

It is our responsibility to seek ways to contribute, large and small.

4. THE GREATEST GIFTS OF ALL.

"Thousands of candles can be lighted from a single candle, and the life of the candle will not be shortened. Happiness never decreases by being shared." — Buddha

Too often, we're too indulged in our own gratifications that we forget there are people in this world whom we can make a little happier.

5. EMPOWER OTHER PEOPLE.

"Abilities wither under criticism; they blossom under encouragement." — Dale Carnegie

You can change the world by helping one person at a time.

6. SEEK TO MAKE A LONG-LASTING EFFECT

"The greatest good you can do for another is not just to share your riches but to reveal to him his own." — Benjamin Disraeli

This is Mr Disraeli's version of "give a man a fish; you feed him for a day. Teach him how to fish, you feed him for a lifetime."

7. STOP WHINING AND DO SOMETHING.

"If you have time to whine and complain about something then you have the time to do something about it." — Anthony J. D'Angelo

When it comes to making a difference, nothing matters more than taking actions.

8. LEAD THE WAY

"A good example has twice the value of good advice." — Author Unknown

Every effort counts, no matter how small and insignificant it may seem. Just do something, and do something good.

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Collaboration

By Julie McMullin

I am really excited for the opportunity to serve as the Chair of the Wisconsin section this year. Thank you to the nominating committee for entrusting me with this important honor. While I have been a member of CSWEA for many years, I only became active in the organization about five years ago. One of my co-workers was the Watershed Committee chairperson, and he was looking for someone to transition to the chairperson role. I had previously been active in other professional organizations such as the Society of Women Engineers and the American Society of Civil Engineers, but my exposure to CSWEA was limited to my occasional attendance at the Annual Meeting. Once I began my role as the Watershed Committee Chairperson, I realized what a collaborative organization CSWEA really is. People from all aspects of the profession and all backgrounds collaborate to not only keep the organization going, but improve upon it every year.

As a volunteer organization, CSWEA depends on its volunteers to keep the organization going, and from what I've seen, there is some great work being done. In the Wisconsin section alone, nearly all of the committees host a seminar, conference, or webinar each year to help carry out the mission of CSWEA beyond the Annual Meeting.

In addition, each year the Annual Meeting has increasingly valuable technical tracks. The conference committee improved upon this by adding an Ethics track to not only increase attendance to the conference, but also provide additional value to those conference attendees who needed to satisfy the ethics portion of their continuing education requirements for the PE (myself included). Also new this year was the addition



of the new utility pricing system, to help attract more utility attendees and the consultants and vendors that follow. These were great innovations to make an already successful conference better.

During my tenure as Section Chair, my primary goal is to continue this environment of collaboration and innovation. I have some big shoes to fill because the past chair, Dave Arnott, did a fantastic job and is truly a valuable asset to CSWEA and in particular, the Wisconsin section. Luckily, Dave is still around to help guide me on the inner workings of the section. In addition, I am lucky to have excellent committee chairs and members who continue their excellent work every year with the need for very little oversight.

Some of my other goals for this year are to revisit the Strategic Plan that was updated in 2012-2013 in order to keep the plan fresh and at the top of everyone's minds. I would also like to increase the interaction between our professional and student members. This interaction is a great outlet for networking and sharing ideas, as well as for investing in the future of the organization and the profession. Please contact me if you would like to help with any of these goals or if you have any suggestions for other possible section goals. My email is jmcmullin@brwnclad.com and my phone is 414-203-2904.

I hope to see you at our events this summer, such as the 27th Annual Classic Collections System Seminar in Watertown on June 5, the CSX meeting in Wisconsin Dells on July 17 and 18, the 7th Annual Northwood's Collection System Seminar in Marshfield on July 24, the Summer Board Meeting and Brewers Game on August 6, and the Pretreatment Seminar in Oshkosh on August 12.

See you soon and have a fun and safe summer! [CS](#)



David Arnott presents Julie McMullin and Eric Lynne Service Awards during the WI Section Meeting on May 14.



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JULY

WI Section 7th Annual Northwood's Collection System Seminar
July 24, 2014
Marshfield, WI

AUGUST

WI Section Management Seminar
August 6, 2014
Milwaukee, WI

WI Section YP Brewers Outing
August 6, 2014
Milwaukee, WI

WI Section Pretreatment Seminar
August 12, 2014
La Sure's Hall, Oshkosh, WI

SEPTEMBER

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

NOVEMBER

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

MAY 2015

88th Annual Meeting
May 18-21, 2015
Drury Lane, Oak Brook, IL

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

CSWEA CSX'14

July 17 & 18, 2014

(Committee & Section Exchange)

All Central States leaders, CSWEA officers, Section officers and committee chairs and members, as well as any interested or involved members should plan to attend our 10th annual Committee and Section Exchange, CSWEA CSX '14. The dates are July 17&18, 2014, and will once again be held at the Kalahari Resort in the Wisconsin Dells. The event is designed to provide for the informal exchange of ideas between Sections and Committees over two half days, beginning at noon on Thursday and ending at noon on Friday. The focus of the agenda will be on the formation of a strategic plan for the organization. In addition to the working sessions, ample time is set aside for networking and social time. The meeting is arranged so that family members can take advantage of the water park while mom or dad attends to CSWEA business. Central States provides a pizza party for everyone on Thursday evening. Make your plans to attend now, and feel free to contact President Jim Huchel or Executive Director Mohammed Haque for additional information.



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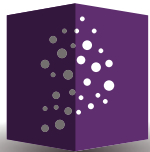


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- Plant Supervisor

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.

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- Owner

Massachusetts (TN < 7 mg/l)

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