CENTRAL STATES WATER

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

86th Annual Conference **Wrap-Up**

PROFILE: City of Stevens Point Wastewater Treatment Plant

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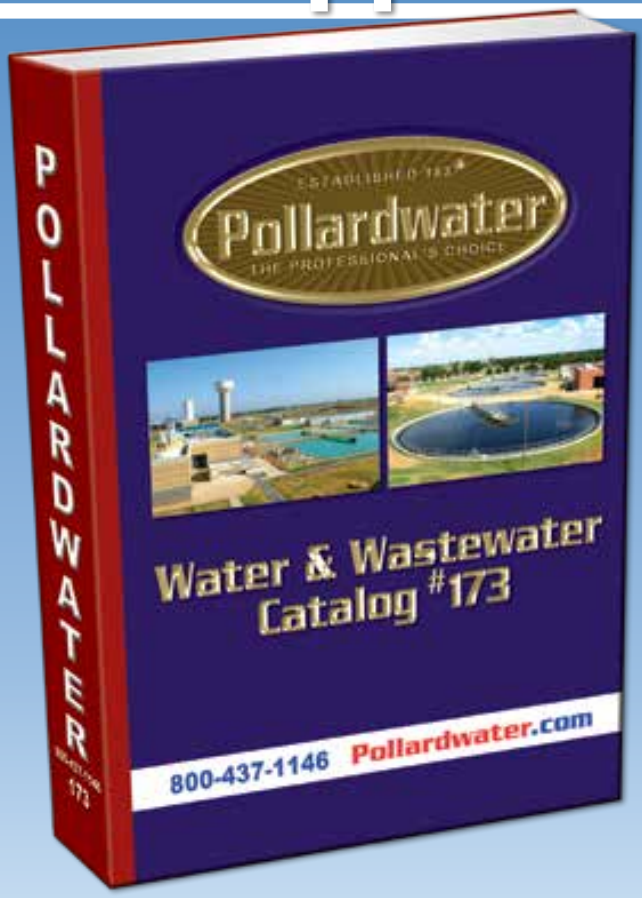

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CSWEA News

Section News

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Managing Editor: Cheryl Parisien, *cheryl@kelman.ca*
Design/Layout: Tracy Toutant
Marketing Manager: Al Whalen, *awhalen@kelman.ca*
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Water's Worth It!

By Patti Craddock

Members of CSWEA, please take to heart WEF's campaign and be a voice for water. Tell a friend, tell a neighbor, tell the world what water's worth to you.

I am fortunate to move into the CSWEA leadership role at the peak of WEF's new campaign. It sure caught my attention and I am making it my mission to bring it to yours. WEF has many campaign materials ready for use for a variety of initiatives. If you have not seen WEF's video, please take three minutes and go to the following link: *http://www.waters-worth-it.org/get-started/*.

So, what was your reaction to the video clip? I felt proud of the job we do.

I was proud to see all the award winners recognized at our Annual Meeting. Be it a top-notch lab analyst, a dedicated servant to our organization, an operator extraordinaire, or a motivated and bright student starting her or his career journey. *Water's Worth It.*

And to all the people who work with and educated our award winners this year (check out the award winner articles in this issue), thank you. Our award winners know who you are and they thank you, too. *Water's Worth It.*

I am also proud of the value we provide at our Annual Meeting. A special thanks to Alan Grooms and the Annual Meeting Local Arrangements Committee, and to Trevor Ghylin and the Technical Program Committee. You provided us a program rich in technical quality, a pleasing venue, and enjoyable social events. This year the committees involved more people in the planning process. It was great to see the teamwork and effort of all involved. So, Minnesotans, come join the fun helping with the 2014 Annual Meeting. It will be held in St. Paul at the Crowne Plaza Riverfront. Let's show that *Water's Worth It.*

> "One of the purposes of the campaign is to teach us to sell our profession and attract the best and brightest to our industry."

It is a privilege to serve our association. For involved CSWEA members, it's been great working with you these past 20 years. For those new to the association, welcome! We encourage you to be active, meet some new people, and learn a few things. To those who have been members, but have not had the opportunity to participate in a CSWEA activity, now is your chance. We will be launching a new website that we hope becomes a go-to site for you. Please visit it, learn about us, and contact a committee member for an activity of interest to you. Why? Because *Water's Worth It.*

In addition to benefitting from WEF's great programs, our association has an amazing executive director and past leaders who have provided excellent vision and the foundation for our work. Mohammed Haque took over as our executive director in December 2012. His dedication and fortitude are very much appreciated. He and his spouse/associate, Amy Haque, survived their first Annual Meeting and have not quit yet (right?). Thank you for a job well done! We appreciate the time that past executive directors, Dan Lynch, and Eric Lecuyer, provided to help Mohammed in the transition and with their past service. Also, thanks to Randy Wirtz, past president, Tim Tack, treasurer (and a past president), and others who provided their leadership and time.

This year's initiatives build on past year's work. We will jumpstart our initiatives at our annual planning meeting, the Central States Exchange (CSX) this July 25-26 at the Kalahari Resort, Wisconsin Dells, WI. We encourage all section committee chairs and officers to attend.

Initiative 1: *Water's Worth It*

This initiative is to assist WEF with spreading the word, and also helps focus on themes that are integral to our other two initiatives related to membership and strategic planning. One of the purposes of the campaign is to teach us to sell our profession and attract the best and brightest to our industry. Like our infrastructure, our professional workforce is aging. Many municipalities have an employee average age in the mid-50s. So, to our young professionals out there, we need more of you and we need you in every facet of the profession.

Initiative 2: Membership

We want to continue to provide quality programs and improve member access to information. To do this, we need to have

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a base of volunteer support to organize the activities and we must attract people to events. As a tri-state association with similar water-related organizations in each state, we compete for member participation and event attendance. We need to recruit new professionals, as retirements will show a sharp decrease in active members. Bottom line: we need to grow our membership and find a formula to sustain it.

Initiative 3: Strategic Planning

Last summer, Randy Wirtz kicked off our strategic planning process with a SWOT (strengths, weaknesses, opportunities, threats) analysis. Doug Henrichsen, Strategic Plan Committee Chair, led a group that began the task of revising the existing CSWEA Strategic Plan. At our CSX meeting (July 25-26), with the help of WEF-based templates, we will look to take ideas from the past year and set the path to create a document that meets our needs today. Mohammed will be bringing some marketing ideas and information from a cross-section of members to assist us.

Time for a little reflection. Seventeen years ago, the CSWEA president at the time was John Fisher. Cindy, John's wife, and daughter, Jenny, were with him at the Farewell Breakfast. John and I both have three daughters. Jenny is John's youngest and is the same age as my oldest, Annie. I recall seeing this poised six-year old sitting through this long breakfast and thinking, not a situation I would have tested with my kindergartener!

This image surfaced when John told me Jenny would be at the Annual Meeting in Madison this year; she was able to join us for two of the evening socials. It then got me thinking about my initial involvement in CSWEA. Somehow I ended up on the Annual Meeting local arrangements committee when John was president. Nearly every year since my first full annual meeting, we connected at a CSWEA event. We learned what our three girls were doing and maybe talked about wastewater.

Two key takeaways from my trip down memory lane: **investing in and including our young professionals.** We need young professionals to serve our organization. We need employers to encourage participation and to recognize the value of being an active CSWEA member. While we did not have the category of young professional 17 years ago, I would have just made the age cutoff. The leaders then, both in CSWEA and my employer, provided me opportunities to be involved and I thank all of you. You showed me that *Water's Worth It*.

CSWEA is about us. It is our connection with each other. It is connecting the research we perform, the process improvements we design, and the innovative O&M practices we implement. It is us sharing information with each other in a forum providing the opportunity to get to know one another and build trust by working as a team on common goals. It is us knowing that *Water's Worth It*. CS

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House of Delegates Activities

By Dave Raby and Rusty Schroedel

The primary activities of the House of Delegates (HOD) since our last article in *Central States Water* have been associated with attending WEFMAX meetings and continuing to participate in activities of the HOD Committees and Work Groups.

Specifically, a few things worth noting have occurred recently and include:

WEFMAX

This year, Rusty, along with several other CSWEA Executive Committee members, attended the meeting in Biloxi, Mississippi in March and Dave attended the meeting in Providence, Rhode Island in early May. The meetings originally were just a sharing of ideas and activities of the member associations attending. The agenda has changed to include talks focused on specific subjects and discussions of the activities of the HOD Workgroups.

The Biloxi WEFMAX, sponsored by the Mississippi Water Environment Association, was attended by nearly 50 member association (MA) representatives, WEF staff, and WEF leadership. Topics included: current WEF initiatives, the activities of the HOD standing committees and workgroups. The WEFMAX presentations included topics such as operator engagement-professionalism, committee engagement, improving your MA annual conference and workshops, public outreach-education (including a very well-received presentation on the successful MN Liquid Assets program by Patti Craddock), two workgroup representative presentations and a presentation on WEF/MA dialog.

The Providence WEFMAX, sponsored by the New England Water Environment Association, was attended by more than 50 WEF staff/leadership members and MA representatives from 21 MAs. Similar to Biloxi, HOD members met first where reports were given relative to the status of the ongoing efforts of the various HOD committees and workgroups (more on this later). Then, WEFMAX presentations were made on various topics and by various workgroups. Dave Raby also plagiarized Patti Craddock's presentation on MN Liquid Assets and presented it.

HOD standing committees

Dave Raby is serving on the Nominating Committee. That committee is in the process of soliciting interested candidates and developing recommendations for the 2013-2014 Speaker of the HOD and other key committee members.

Rusty Schroedel is serving on the Steering Committee. The committee is working on a flow chart and description to help members, committees, and MAs understand how information flows from the HOD to the Board of Trustees (BOT). The Budget Committee developed a new process to provide input prior to the budget being set to help better represent priorities of member associations.

The WEFMAX committee reported positive feedback on the new WEFMAX format (topical presentations versus one presentation by each MA). They announced that the state locations for next year's WEFMAXs have been selected and will be Michigan, New York, Montana and South Carolina.

HOD workgroups

The goal of the MA Sustainability Work Group (WG) is to focus on ways that MAs can become more sustainable. Dave Raby is the vice-chair of this WG. They plan to prepare a template for use by MAs in developing strategic plans and also to pull together a list of strategic planning best practices. The Engagement/Value SWG has gathered information on best practices for member recruitment and retention and plans to update the WEF Recruitment and Membership Guidebook that was last updated in 2006.

Non-dispersibles: The workgroup has requested information that will help with their efforts on education and industry labeling of products that are truly "flushable" and disperse in the wastewater versus non-dispersibles. Information on the cost and problems created by non-dispersibles will provide valuable, necessary data to substantiate the need for other actions. The request for information has been provided through our Central States e-mails and is also available on the WEFCOM site.

Operator outreach: This WG successfully presented excellent materials at the WEFMAX meetings in Biloxi and Providence. Issues discussed included certification needs and technical sessions and education opportunities that are focused on the operator.

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Strategic planning: Rusty Schroedel is chairing this WG. A two-page summary of this WG's activities and plans were distributed and discussed at this year's WEFMAX meetings. Two of the SWG (Mentoring, Training and Development of Delegates and Improve Process of Soliciting Input from MAs) have developed surveys to gage the interest and issues that the MAs are seeing. Your delegates will be working with their respective committees and workgroups to complete their plans for this WEF year in order to have documents, deliverables, and tasks addressed before WEFTEC in early October in Chicago.

The WEF Nominating Committee has recently completed its work and submitted a report for endorsement by the Board of Trustees (BOT) and confirmation by the HOD at the upcoming WEFTEC meeting in Chicago. Following are the slate of nominees that will be presented to the BOT and HOD:

- WEF Vice President, Paul Bowen, PhD; Director of Sustainable Operations for the Coca-Cola Company; Atlanta, GA
- BOT
  - Tom Kunetz, AAEE, WEF Fellow; Assistant Director of Engineering – Strategic Engineering Initiatives; Metropolitan Water Reclamation District of Greater Chicago; Chicago, IL
  - Erin Mosley; Business VP and New England Area Manager for CH2M HILL; Boston, MA
- HOD Delegate-at-Large
  - Tim Kraus; VP with O'Brien & Gere; Louisville, KY
  - Candice Elder; Business Development Manager with Farr West Engineering; Sparks, NV
  - Patrick Karney; VP and Global Director/Wastewater and Wet Weather Initiative Lead for CH2M HILL; Green Cove Springs, FL
  - Michael Kyle; Executive Director for the Lancaster Area Sewer Authority; Lancaster, PA

Dave Raby will complete his term as delegate representing CSWEA at the upcoming WEFTEC meeting in Chicago in October. At the Annual Business Meeting in Madison, Eric Lecuyer was elected as the incoming delegate. He will assume that role at the HOD meeting at WEFTEC in Chicago as Dave completes his term. CS

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Cycle of Water

Mohammed Haque

Zaid, my son, came home from school with this masterpiece a few weeks ago. I naturally told him how great it was and complimented him for his color selection, styling and artistic ability. You gotta admit, the kid definitely picked some good colors.

When he told me that he thought I would like it because of Central States, I was touched. That was pretty cool. I told him how awesome that was, and thanked him for thinking of CSWEA for his class assignment. I asked him if I could write about it in our next edition of the magazine, and he of course granted me all reproduction rights to his masterpiece. Thank goodness he did not want royalties, because as I explained to him, the "budget is tight."

As I thought about his drawing, I realized that there was a big part of the cycle that goes missing in our elementary education system. While his cycle of water makes a lot of sense in the natural world, it does not cover how humans use water. **Missing is our water treatment, use in all its forms, and wastewater treatment.** While I am sure that many schools do cover that part, I am sure others, for the sake of simplicity, miss it.

Hopefully, as we educate our children, they too will learn that the way that we use, clean, and recycle our water, is the most important part of the cycle. It is the only part that we control, and the only part that we have the ability to do extremely well. CS

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Biosolids: Resource or Refuse

The 2013 Education Seminar featured a program focused on biosolids. The seminar focused on both public and industry perceptions of biosolids. While many use the nutrient-rich biosolids for application to agricultural land, recent issues such as the presence of micropollutants and excess nutrients highlight potential challenges to land application and remind us that biosolids might be considered a refuse. The keynote addressed the future of biosolids, and discussed regulatory and public policy drivers; technology, operations, and management trends; professional and training needs; and research needs over the next decade. Other speakers focused on marketing of dried biosolids, overapplication of phosphorus-laden biosolids, challenges with dewatering bio-P sludge, digester foaming, and the benefits of a co-digestion program.

The proceedings for the 18th Annual Education Seminar can be found at *www.cswea.org/papers*. CS

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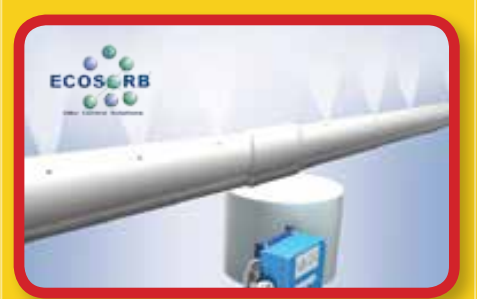

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Doing More With Less | 86th Annual Conference **Wrap-Up**

By Randy Wirtz, Immediate Past President

For those of you who attended the 86th Annual Conference in Madison, I sincerely hope you thoroughly enjoyed your week. The weather and the venue at the Monona Terrace was beautiful, and the networking and educational opportunities were consistently great. I sincerely appreciated the opportunity get reacquainted with old friends as well as to meet a lot of new ones and active members. The annual conference always serves as a great reminder of how vibrant CSWEA is, and this year was certainly no exception! Our Local Arrangements Committee is to be congratulated. Putting this conference on is a huge undertaking, and the group put in countless hours over several months. Our LAC was chaired by Alan Grooms, and the committee is listed below:

Alan Grooms, Madison MSD – 2013 Committee Chair
Tom Mulcahy, Mulcahy Shaw Water – Exhibits Chair
Ben Heidemann, Town & Country Engineering – Exhibits and Silent Auction
Jennifer Hurlebaus, AECOM – Catering and Social Chair
Chad Olsen, McMahon Associates – Catering and Social
Jim Fisher, CH2M HILL – Catering and Social
Joan Hawley, Superior Engineering – Printing & Signage
Greg Gunderson, MSA – Printing & Signage
Keith Haas, Racine Water & Wastewater Utility – Registration
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Greg Droessler, Clark-Dietz – Golf Outing
Jon Butt, Symbiont – 5K Run/Walk
Trevor Ghylin, CH2M Hill – Technical Program Chair
Jason Benson, AE2S – Technical Program Committee
Derek Wold, Baxter & Woodman – Technical Program Committee
Tracy Hodel, City of St. Cloud – Technical Program Committee
Jeremy Cramer, Stevens Point WWTP – Technical Program Committee
Rick Manner, Urbana/Champaign SD – Technical Program Committee

The first event of the conference was the golf scramble on Tuesday afternoon. We played the Bridges Golf Course on a wonderfully sunny day, and the brothers team of Tim and Bob Bate, and Kurt and Luke Hellermann took honors with a 10-under-par round. Our meet-and-greet followed on Tuesday evening and started with more beautiful weather on the rooftop of the Monona Terrace before the only inclement weather of the week caused us to move inside for the last half of the meet-and-greet.

Our keynote speaker was Dr. David Garman from the University of Wisconsin-Milwaukee School of Freshwater Sciences. Dr. Garman is the first dean of this newly established department, and his perspective on the application of technology to solve world water supplies was both enlightening and challenging – exactly the kind of keynote talk to get our creative and technical juices flowing. The technical program that followed on Wednesday and Thursday was again exceptional and provided great opportunities to learn about the newest innovations and applications in the wastewater treatment and collection system operations and design.

Based on feedback we received from our members last year, we tried something new for the social event on Wednesday night. We simply reserved the upper floor of a local Irish pub, and the turnout was exceptional. This was a great networking and socializing opportunity, and the space

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was packed for much of the night.

Many individuals and organizations in Central States are doing award-worthy work, and we acknowledged some of these efforts with WEF and CSWEA awards at our Thursday evening banquet. The 86th Annual Meeting winners are pictured on several pages in this magazine, so please look them over and congratulate the winners when you see them.

Our farewell speaker was Eric Rothstein, who has more than 20 years of experience in utility finance and rate-making analyses, asset management, evaluation of public-private partnership options. Eric provided a compelling case for the increased use of private financing and alternate delivery methods for major projects in the United States. He stretched our comfort level to get us to think outside our normal way of doing business and encouraged us to value the service we provide by charging appropriate rates for water and wastewater.

Finally, a very sincere and special THANKS to our sponsors and exhibitors! These organizations share their experience, services, and technology with us to improve the water environment. Their financial support and commitment to CSWEA is what allows us to make the annual conference affordable and exceptional. Please review the sponsor list below and thank these organizations for their continued support of CSWEA!

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Thanks to all who attended!

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Crowne Plaza - River Front, St. Paul, MN

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Robert Trueblood
Fox River Water Reclamation District

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Collection System Award
Keith McKeen
Village of New Lenox, Illinois

Industrial Environmental Achievement Award
Grande Cheese Company (accepting is Todd Hammond), Lomira, WI

Academic Excellence Award
Adam Groshek
University of Wisconsin - Platteville

Collection System Award
Tim Bate
Milwaukee Metropolitan Sewerage District

Young Professional of the Year Award
Michael G. Holland
Trotter & Associates, Inc.

Academic Excellence Award
Sally Shumaker
University of Wisconsin - Madison

Gus A. Radebaugh Award
Chris Wilson, Greeley & Hansen
Jennifer Hindel (accepting is John McDonnell)
Thorn Creek Basin Sanitary District
"Ironing Out the Impacts of Industrial Wastewater"

Bill Boyle Educator of the Year Award
Dr. Paige Novak
University of Minnesota

Academic Excellence Award
Allen Williams
Marquette University

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Award **Winners**

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University of Wisconsin - Milwaukee

Doing More With Less

Congratulations Award Winners!

Seven S winners
Pictured left to right are: Jim Shaw, Rick Manner, Bill Oldenburg, Jim Beier, John Hart, Mike Holland, John Friel, Troy Larson

NOT PICTURED

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WEF Quarter Century Operator's Club
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Academic Excellence Award
Amanda Heller
Milwaukee School of Engineering

Student Design Competition – Wastewater
Sally Shumaker, Antonio Garcia, Ben Kultgen, Daniel Schwartz
University of Wisconsin-Madison
"Closing the Loop on PET Recycling: Waste Treatment at Placon Corporation"

Student Design Competition – Environmental
Alyssa Sohn, Hectro Briceno, Michael Azzarello, Donnie Manhard
University of Illinois – Urbana/Champaign
"Combined Sewer Overflows in Mishawaka, Indiana"

Student Paper Competition – Undergraduate
Antonio Garcia
University of Wisconsin-Madison
"Testing for Statistical Difference in Methods of Water Filtration"

Student Paper Competition – Graduate
Amanda Heller
Milwaukee School of Engineering
"System Design and Economical Study of Wastewater Reuse for Northwestern Mutual Life"

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5k Run/Walk

Fifteen runners and walkers took off on an urban course to complete the 5K run/walk challenge on a picture-perfect Wednesday morning. Each participant provided a prediction of how long it would take and the goal was to actually finish the race as close to the prediction as possible. The route took participants along the lake, through interesting neighborhoods, along the Capital City bike trail and finally around the state capital. The total distance was 3.1 miles. Of the participants, nine completed the course faster than their predictions. The winner was Jim Beier, Crane Engineering, who finished within 23 seconds of his prediction. In second place was Tracy Hodel, City of St. Cloud, MN, who finished within 39 seconds, and in third place was Steve Reusser, Madison MSD, who finished within 53 seconds.

Special thanks to all of our generous sponsors of this year's event: Symbiont, Energenecs, Superior Engineering, Mulcahy/Shaw, and Durable Controls. CS

Kneeling: Amber Marzahl, Eric Lynne, Tracy Hodel
Standing: Jim Fischer, Dave Raby, Dotty Raby, Amanda Poole, Eric Lanphier, Scott Trotter, Jim Shaw, Al Whalen, Jim Beier, Jay Kemp, John Kampart, Steve Reusser

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Conference at a **Glance**















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Patti Craddock
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pcraddock@sehinc.com

1st Vice President
Jim Huchel
City of Crystal Lake
Phone: 815-459-2020 Ext 4168
jhuchel@crystallake.org

2nd Vice President
Keith Haas
Racine Water & Wastewater Utility
Phone: 262-636-9181
keith.haas@cityofracine.org

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Lai Ltd.
Phone: 847-392-0990
ttack@lai-ltd.com

Immediate Past President
Randy Wirtz
Strand Associates, Inc.
Phone: 608-251-4843
randy.wirtz@strand.com

WEF Delegate '13
Dave Raby
Howard R. Green Company
Phone: 651-644-4389
draby@hrgreen.com

WEF Delegate '14
Ralph B. (Rusty) Schroedel
Brown and Caldwell
Phone: 414-203-2925
rschroedel@brwncald.com

PWO Representative '13
Todd Carlson
City of Duluth
Phone: 218-591-2343
tcarlson@duluthmn.gov

YP Representative '14
Eric Lynne
Donohue & Associates
Phone: 920-208-0296 ext 7375
elynne@donohue-associates.com

Illinois State Section Trustee '15
Dean Wiebenga
Peterson and Matz, Inc.
Phone: 847-624-5226
deanpmi@aol.com

Minnesota State Section Trustee '14
Doug Henrichsen
Brown and Caldwell
Phone: 651-468-2077
dhenrichsen@brwncald.com

Wisconsin State Section Trustee '15
Brandon Koltz
Brandon Koltz Water & Environmental Consulting
Phone: 414-453-6669
brandon.koltz@gmail.com

Executive Director
Mohammed Haque
CSWEA
Phone: 855-692-7932
mhaque@cswea.org

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jhuchel@crystallake.org

Keith Haas, Co-Chair
Racince Wastewater Utilty
262-636-9434
keith.haas@cityofracine.or

Academic Excellence Sub-Committee
Keith Haas
Racince Wastewater Utilty
262-636-9434
keith.haas@cityofracine.or

Local Arrangements Committee 2013
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CH2M Hill
651-688-8772
mark.enochs@ch2m.com

Nominating Committee
Jim Miller
Foth I&E, LLC
612-961-2505
jim.miller@foth.com

Technical Program Committee
Tracy Hodel
City of St. Cloud
320-255-7226
tracy.hodel@ci.st.cloud.mn.us

Public Education Committee
Patti Craddock
Short Elliott Hendrickson
651-490-2067
pcraddock@sehinc.com

Students Committee
Mike Holland
DeKalb Sanitary District
815-758-3513
mholland@dekalbsd.com

Young Professionals Committee
Eric Lynne
Donohue & Associates
920-208-0296 Ex 7375
elynne@donohue-associates.com

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Mulcahy/Shaw Water
262-241-1199
tmulcahy@mulcahyshaw.com

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2013 Stockholm Junior Water Prize State Finalists Announced

Congratulations to all students who entered the U.S. Stockholm Junior Water Prize state competitions! There were a record number of entries this year and many excellent papers that choosing state winners proved to be a very difficult decision to make.

The purpose of the SJWP program is to increase students' interest in water- related issues and research, and to raise awareness about global water challenges. The competition is open to projects aimed at enhancing the quality of life through improvement of water quality, water resources management, water protection, and water and wastewater treatment.

The Pacific Northwest Clean Water Association will host the 2013 U.S. Stockholm Junior Water Prize National Competition to be held in Portland, Oregon. Students from around the United States will gather for two days of camaraderie, competition, and celebration at the Red Lion Hotel on the River – Jantzen Beach, where they will have the opportunity to meet with like-minded students to discuss their research projects and exchange ideas, as well as see the sites of the city at this fun and educational event from June 14-15, 2013.

As in past years, Central States Water Environment Association is sponsoring the state winners from Minnesota and Wisconsin. The Illinois Water Environment Association sponsors the state winner from Illinois. The winners from the three states are listed below.

Illinois
Anna Gupta and David Lisk: "An Egg-Based Water Filter." – IMSA, science teacher – Mark Carlson.

Minnesota
Samantha Woog: "Designing a Novel Microbial Nanochemical Pathway for Aerobic Water Bioremediation." John Marshall High School, science teacher – Eric Stanslaski.

Wisconsin
Isabella Cafaro and Sarah Organ: "Reducing Escherichia coli and Fecal Coliform Contamination at South Shore Beach." Divine Savior Holy Angels High School, science teacher – Betty Jo Azpell.

The U.S. winner will receive $10,000 (USD) and an all-expense- paid trip to Stockholm, Sweden for the international competition, as well as, the opportunity to present their research to water quality experts at WEFTER 2013, WEF's 86th annual technical exhibition and conference, this October in Chicago, IL. CS

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Committee and Section Exchange (CSX '13)

July 25-26, 2013 • Kalahari Resort, Wisconsin Dells, WI

Central States will be hosting CSX '13 on July 25-26, 2013 at the Kalahari Resort and Convention Center, Wisconsin Dells, WI.

There is no fee to register for CSX '13 and the event will kick off at noon on Thursday, July 25, 2013 with a working lunch, recess at 5:00 p.m. for CSWEA's Annual Pizza Party (open to all), resume at 8:00 a.m. on Friday and adjourn at noon. The format is set to encourage families to tag along and enjoy a mini-vacation while mom or dad attends CSX.

CSX is a strategic planning meeting, with the open exchange of ideas and experiences intended to guide the association in the future. The agenda will follow.

We look forward to seeing you at CSX! CS

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CSWEA LEADERSHIP ACADEMY

By Eric Lynne, YP Representative

CSWEA held its Fourth Annual Leadership Academy on April 1 at the Monona Terrace in Madison, Wisconsin. The seminar had 27 attendees from various backgrounds who sat in a variety of seminars to help aid them through their careers. Many were repeat attendees, which illustrates the true benefit of this seminar. Jaime Thompson, Dekalb Sanitary District summed it up well:

"This was my second year attending the YP Leadership Academy and I feel like I learned more this year than last because I was more relaxed going into it. I really enjoyed the networking opportunities that come along with attending these conferences. I made some great new contacts and was able to find out more ways I could get involved in my profession. Madison is a beautiful city and a great location for the conferences; it really encompasses the fresh and innovative excitement that being a young professional is all about. I find that whenever I attend the YP Leadership Academy I come back to work feeling more motivated and inspired to see what changes I can make within myself and my company."

The 2013 theme was *A Change is Gonna Come*, implying discussions around how to handle changes in our careers. Presentation topics were titled: *Leading Change; Having the Right Perspective; Leadership Transitions; Applied Leadership and Examples; Leading Regulatory Change; Wastewater Trends for Young Professionals.*

The presenters had a variety of backgrounds with both technical and business perspectives present throughout the seminar. Central States offers this seminar to all members and although most of the attendees are earlier in their careers, we

believe it is a nice seminar to be enjoyed by all members.

"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

Since networking is a key component in almost every profession, an icebreaker-style speed-networking event was held to quickly force every attendee to meet each other. The networking event was well received with numerous comments received similar to the following from Matt Streicher, Wheaton Sanitary District.

"Although I've attended the Educational seminar in Madison every year, this was my first year attending the Young Professional Leadership academy the day previous to the seminar. Having attended a few other YP events previously that entirely organized, I was unsure how beneficial this academy would be. In fact, I had to persuade my boss to allow me to go the extra day, since he wasn't sure how beneficial it would be either.

Networking with the other YPs during the academy also gave way to further conversations/networking at the meet and greet, and then the Ed Seminar the next day as well. Since we are anticipated to be the next wave of leaders in the industry, it's nice to establish a relationship with others early on in our careers so we can develop together."

The seminar is held in conjunction with the Annual Education Seminar and the registration fee does not cover the full cost of the seminar, but CSWEA believes it is important that we offer opportunities to our younger members to attend CSWEA events and potentially allow them to attend the technical Education Seminar the following day at a nominal cost.

We welcome any feedback or suggestions on improvement for the seminar. With this being a new seminar, the more members willing to participate, the better the seminar will become. Someday we would like to see this seminar have the same recognition as the Education Seminar.

"Going into the YP Academy I did not expect the event to have such a thoughtful blend of industry trends and professional insights. What made the professional insights so poignant was the diversity and depth of the presenters' careers. As a young professional, it was valuable to hear from seasoned professionals regarding lessons they have found to be important in their career and to the success of their organization. This worked to both broaden my understanding of the water/wastewater field and to provide a focus on the necessary skills for my professional development." – John Ross, Brown and Caldwell

I 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. CS

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In Memoriam

Alva Rankin

Alva Rankin, 61, of Lake Nebagamon, Wis., died July 23, 2012 in an automobile accident near Hinckley, Minn.

Alva's first love was family, and with wife Anne, was a foster parent for 12 years. They both worked tirelessly for Kids in Nebagamon assisting children and families in need.

Alva was an avid hunter, fisherman and handball player. He was committed to the environment and worked often with the Wisconsin Dept. of Natural Resources and water environment organizations. Professionally he continued this work with engineering firm Short Elliott Hendrickson specializing in community water system issues.

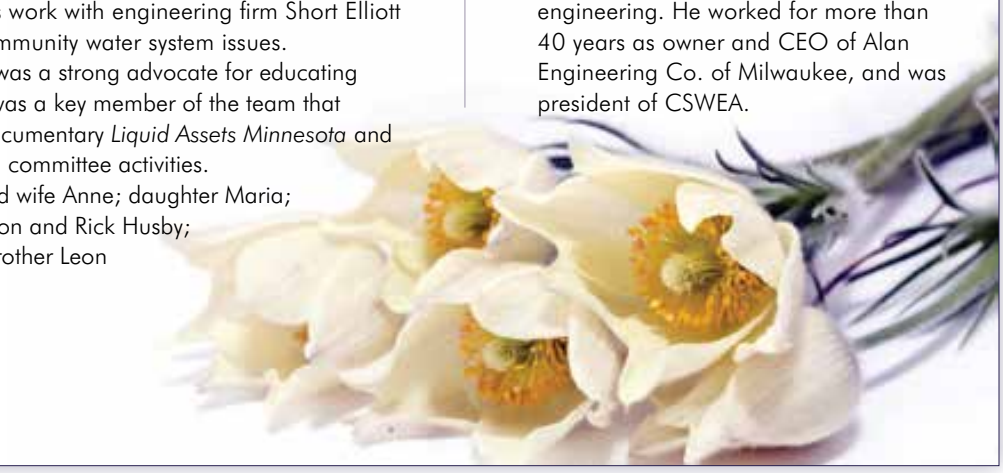
As a CSWEA member, Alva was a strong advocate for educating the public on water issues. He was a key member of the team that organized and produced the documentary *Liquid Assets Minnesota* and participated in collection system committee activities.

He is survived by his beloved wife Anne; daughter Maria; sons Ty and Damen; stepsons Ron and Rick Husby; father Leon; mother Beatrice; brother Leon and sister Lenise.

He will be sorely missed.

Bernard Victor Pfeiffer, Jr.

"Vic" Pfeiffer passed away April 24, 2013 at Hope Hospice in Bonita Springs, Florida. He was born in Philadelphia and graduated from Stevens Institute of Technology with a mechanical engineering degree and later obtained a master of science degree from the University of Wisconsin in sanitary engineering. He worked for more than 40 years as owner and CEO of Alan Engineering Co. of Milwaukee, and was president of CSWEA.



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City of Stevens Point
Wastewater Treatment Plant

By Jeremy Cramer, Stevens Point Wastewater Superintendent

The City of Stevens Point, located on the Wisconsin River in Central Wisconsin, has always placed great importance on the water that flows to and from this small community. This is evident as you enter the city and see the inscription along the highway that depicts Stevens Point as the "City of Wonderful Water." From the city's earliest beginnings, water has played a valuable part in shaping this community. In the 1800s the water in the Wisconsin River was used as a highway to transport logs to mills that thrived in Stevens Point and the surrounding communities. In the late 1800s and early 1900s the river provided a source of drinking water for the residents of Stevens Point. Today, the river provides a great source of recreation to the area, boosting the tourist industry and providing beauty to the residents that call Stevens Point home. The community has and always will value this great resource and will protect it and keep it clean.

In its effort the keep the Wisconsin River clean, the city has owned and operated a wastewater treatment plant for the past 73 years. In 1940, the city built a secondary treatment plant as its first wastewater treatment facility. The original facility, designed by Consoer, Townsend, and Quinlan Consulting Engineers, used the activated sludge process, anaerobic digestion, a 40 kW biogas generator, and a vacuum filter on digested sludge. This 1940 facility was built with great foresight as the facility was a fairly advanced treatment plant for the size of the community. To this date, most of the original tanks and building are still in use. Since its initial inception, the facility has undergone three upgrades, one in 1965, one in 1972, and another in 1993. These three major upgrades which helped increase capacity and efficiency were all

Table 1:
Influent Flows and BOD5 Loadings

Year	Influent Flow (mgd)	Influent BOD5 (lbs/day)
2008	3.01	6080
2009	2.85	6633
2010	3.14	7175
2011	3.15	7879
2012	2.77	8103

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designed by Strand Associates. There have been some minor additions and changes at the facility over the past 10 years. The most recent addition at the facility was a biogas CHP project that was designed by Donohue & Associates in 2012. Over the many years of its existence, this facility has been operated quite efficiently and effectively while consistently producing a very high quality effluent. In 1980, the facility was the recipient of an EPA award for exceptional operation and maintenance and in 2007 the facility received the WI DNR lab of the year award. Just recently, the superintendent and the operating staff were the recipients of the Central States Water Environment Association's Wisconsin Section Treatment Facility Operation's Award at the 86th Annual Meeting.

Plant information

The Stevens Point WWTP staff consists of four operators, one chief operator, and the superintendent. The wastewater facility serves a population of approximately 27,000 people as well as the UW Stevens Point campus. The largest industrial customer that discharges to the facility is the Stevens Point Brewery. The collection system in Stevens Point consists of over 140 miles of sanitary sewer and 15 liftstations.

The treatment plant is designed for an average daily flow of 4.6 mgd and a peak hourly flow of 11.8 mgd. Design BOD_5 and TSS loadings are 10,300 lbs/day and 10,400 lbs/day. Average influent flows and BOD_5 loadings from 2008 through 2012 are summarized in Table 1. As seen in the table, influent loadings have gone up every year for the past five years. This increase in loadings is due to accepting more septic and holding tank waste and the recent expansion of the Stevens Point Brewery.

Influent pumping and preliminary treatment

The raw wastewater that enters the facility is carried up thirty feet by one of two 78-inch diameter screw pumps. Each screw pump has a capacity to pump 11.8 mgd. After the screw pumps, flow is sent through two Vulcan fine screens with 3 mm spacing to capture and remove any solids or screenings greater than 3 mm. The screenings are then washed and compacted and sent to the landfill. Flow is then sent through a Pista Grit vortex grit removal system to remove sand or grit from the system. The grit that is removed from the flow is then sent to a Huber grit washer before it is sent to the landfill. After grit removal, flow is then sent to two rectangular primary settling tanks. Sludge is removed from the bottom of the primary tanks via two ODS air driven diaphragm pumps and sent to the anaerobic digesters.

Secondary treatment

Stevens Point uses the anaerobic/oxic (A/O) process for biological phosphorus removal. After primary treatment, flow is sent to the anaerobic basin and then through three aeration basins operating in parallel. The aeration basins use fine bubble membrane diffusers and air is supplied via a 150 hp variable speed Atlas Copco positive displacement screw blower. The total treatment volume of the activated sludge basins is 1,107,856 gallons. After the aeration basins, mixed liquor is sent to two 75-foot diameter final clarifiers.

Disinfection

After final clarification, secondary effluent is sent through a Trojan 3000+ UV light system from May 1 through September 30. After all treatment, water is discharged to the Wisconsin River.

Biosolids and anaerobic digestion

Excess activated sludge is sent to dissolved air floatation thickeners for thickening prior to digestion. Primary sludge and waste activated sludge is sent to one of three mesophilic anaerobic digesters that have a total treatment volume of 735,000 gallons or 98,300 cubic feet. Two of the digesters have Perth gas lance mixing systems and the other digester is mixed via an Ovivo linear motion mixer. There is also a substantial amount of high strength waste added to the digesters. The high strength waste material that is added to the digesters includes dairy waste, FOG, liquefied food waste, and beer waste. The digesters are currently producing approximately 103,000 cubic feet of biogas per day. After digestion, biosolids are sent to a rotary drum thickener. Thickened biosolids are sent to one of two 1.6 million gallon sludge storage tanks. Liquid biosolids are land applied for beneficial reuse on local farm fields in spring, summer, and fall.

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Biogas treatment and utilization

Biogas that is produced in the anaerobic digesters is beneficially used around the facility. The biogas is either burned in the digester boilers or in a MAN 180 kW internal combustion CHP unit. Before use, the biogas is sent through a Unison Solutions gas treatment system comprised of hydrogen sulfide, siloxane, and moisture removal. Currently the facility is approaching being 95% energy sustainable.

Table 2:
WPDES Permit Limits (Monthly Ave)

CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	TP (lbs/ day)
25	30	0.93	35

Table 3: Effluent Quality

Year	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)
2008	3.31	4.22	0.79
2009	3.28	4.05	0.74
2010	3.96	4.61	0.71
2011	4.76	5.70	0.54
2012	5.02	5.68	0.63

Plant performance

The treatment plant consistently meets its WPDES permit limits which are summarized in Table 2. The effluent quality from the Stevens Point WWTP has been very consistent and is summarized in Table 3. The treatment plant staff is not only proud of producing a high quality effluent, but doing so in a very cost effective manner. Over the past 10 years the facility has taken full advantage of biological phosphorus removal and has consistently met permit limits without using any chemical or metal salts. Besides spending little money on chemical costs the facility is also run in a very energy conscience manner. The facility's current average of purchased electricity cost per million gallons is at 343 kWh/mgal. The Stevens Point wastewater facility will continue to treat wastewater in an energy efficient manner while producing the valuable end products of clean water, biosolids, and biogas. CS

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CSWEA/IWEA to host 18th Annual WEFTEC Welcome Reception at WEFTEC'13

CSWEA and IWEA members are invited to join us for this year's WEFTEC'13 CSWEA/IWEA Reception, Sunday, October 6, 2013. The reception will be held from **6:00 to 8:00 p.m.** at the **Hilton Chicago** at 720 S. Michigan Avenue. Our joint WEFTEC Welcome Reception has become a not-to-miss event for members and friends attending WEFTEC and offers an outstanding kickoff each year. The reception will be held in the Boulevard Room & Foyer, second floor of the WEFTEC'13 headquarters hotel in Chicago. All members and supporters of CSWEA and IWEA are invited to attend!

Event Name: **Central States WEA & Illinois WEA Joint Welcome Reception**
Event Date/Time: **Sunday, October 6, from 6:00-8:00 p.m.**
Room: **Boulevard Room & Foyer, 2nd Floor**

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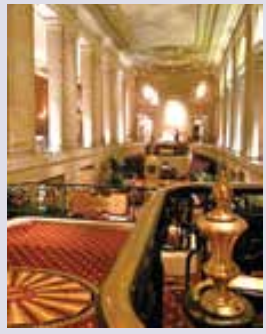

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CSWEA Welcomes Our New Members

January, 2013

- Kelly Pierce
- Mark Hessel
- Brent Lautenbach
- Daniel Carey Jr.
- Allen Williams
- Brandon Janes
- Ted Sowa
- Jamie Freund
- Preston Carter
- Thomas Berg
- Jonathan Kusowski
- Kathryn Sterk
- Dr Pat Chiang
- Dr Lawrence Alan Baker
- Patrick Rein
- Nicholas Janous
- David Modrowski

February, 2013

- Ryan Cramer
- John J. Ross
- Mike Cassidy
- Jessica Kirschbaum
- Tony Birrittieri
- Mr Jeffrey A Simpson
- Bob Redelings
- Rod Beadle

March, 2013

- Gene Sullivan, Jr
- Jeffrey Simpson
- Chuck Graber
- Keith McKeen
- Jackie Christensen
- Jason Carroll
- Amanda Heller
- Michael Hartmann
- Dr Nina Cunningham
- Michael Mucha
- Madeleine Mahan

April, 2013

- Kevin Mraz
- Nicholas Galante
- Carol Crivello
- Mark Doneux
- Brent Roering
- Michael Sargent
- Matthew Burggraff
- David Miller
- Donald Ahlschlager
- Dr Alice Ann Sorensen
- George Dodson

May, 2013

- Robert Rapaway
- Christopher Molidor
- Jeremy Bril
- Sally Shumaker
- Li Xiao
- Adam Groshek
- Anna Munson
- Randy Stein
- Shanel Traver

June, 2013

- Jackie Gallagher
- Amelia Holm
- John Kittleson
- Bryan Viitala
- Mark Duerr
- Patrick Thomas Kelly
- Montgomery Baker
- Lee Hoffman

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Ironing Out the Impacts of Industrial Wastewater

A proven technology supports the growth of local industry and improves treatment plant operation

Christopher Wilson, John McDonnell, Jennifer Hindel, Debby Martch, and David Hobbs

The Thorn Creek Basin Sanitary District (Chicago Heights, Ill.) provides wastewater treatment services in south suburban Chicago. In addition to treating domestic wastewater from the local area, the district has a substantial industrial base.

When the district's largest industrial discharger requested permission to increase its discharge of sodium sulfate to the treatment facility by approximately 40%, the district evaluated the potential effects and created a ferric chloride dosing system to handle the extra loading. Not only does the district's solution enable a local business to expand, it also alleviates the extra operational and maintenance requirements at the treatment facility associated with the waste flow from this industry.

The biggest gets bigger

Rhodia Incorporated, located in Chicago Heights, Ill., produces silica and is the largest industrial discharger to the district's system. The main pollutants of concern in the company's wastewater are sodium sulfate and total dissolved solids (TDS). Rhodia had a discharge limits for sulfate and total dissolved solids (TDS) of 46,556 kg/d (102,638 lb/d) and 68,821 kg/d (151,725 lb/d), respectively.

In December 2008, Rhodia requested a 40% increase in the amount of sulfate to 64,801 kg/d (142,862 lb/d), which corresponds to a TDS discharge of 95,753 kg/d (211,300 lb/d).

Additionally, Rhodia requested an intermediate increase of approximately 17%. This intermediate increase corresponded to the capacity of the Rhodia facility prior to any expansion. Discharge based on the 17% increase began in July, prior to the completion of the Rhodia facility expansion.

Measuring the effects

The district operates a wastewater treatment plant comprised of preliminary treatment, primary settling, nitrifying activated sludge treatment, sand filtration, chlorination, and dechlorination. Primary and waste activated sludges are processed by anaerobic digestion and land application. Digester gas is used to heat the anaerobic digesters and some buildings.

Prior to this project, sulfate loading to the plant caused corrosion and yellow-white crystalline deposits on the hot gas tubes that serve the combination boiler/heat-exchanger units in the plant's biogas handling system. The district operations and maintenance personnel reported operational difficulties and increased maintenance needs as a result of the accumulation of the crystalline deposits. In general, required maintenance was viewed as a significant adverse impact of high level TDS and sodium sulfate in the influent.

The district, aided by Greeley and Hansen (Chicago), conducted a study to evaluate the current and future effects of sodium sulfate loading on the plant. Specifically, the study used literature resources and laboratory tests to evaluate impacts to the operation of both liquid and solids treatment trains at the district's main plant.

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Liquid biological process toxicity

Because sodium sulfate dissociates to sodium and sulfate ions, the district assessed saline toxicity. Literature sources suggested that aerobic biological sludges can be acclimated to concentrations of sodium exceeding 3% weight/volume (w/v) in solution. In addition, nitrifying bacteria are adaptable to a wide range of salt concentrations, as evidenced by nitrifying bacteria (*e.g., Nitrosomonas and Nitrobacter sp.*) having been identified in fresh (domestic wastewater) and saline (marine) environments.

Lab data showed that the district's liquid train TDS concentration has not exceeded 0.3% w/v from 2003 to 2009. At the 17% and 40% increases, projected activated sludge sodium concentrations are 490 ppm and 580 ppm, respectively.

These concentrations are within the acceptable range for nitrifying activated sludge operation. Therefore, the district anticipated no negative effects to the baseline biological performance of the liquid treatment train based on sodium loading.

Effluent sulfate concentration

The district recently renewed their NPDES permit with the Illinois EPA. The plant has an effluent sulfate (SO_4^{2-}) permit limit of 1860 mg/L in summer and 1852 mg/L in winter.

Most of the TDS attributable to sodium sulfate that enters the plant remains in the liquid treatment train and is discharged with the final effluent. Only the sulfur contained in the biogas and that which is land-applied with biosolids can be considered as being removed by the wastewater treatment plant.

Increased loading of TDS and sodium sulfate by Rhodia will increase the TDS and sulfate concentration in the district's final effluent. At 17% and 40% increases in Rhodia's discharge, the sulfate effluent concentration is calculated to be 1510 ppm and 1730 ppm, respectively. These values are based on a dry weather flow rate of 41,260 m^3/d (10.9 mgd) and an increase above the previous daily Rhodia sulfate discharge of 46,556 kg (102,638 lb).

Activated sludge settling

Interactions between activated sludge multivalent cations and biological floc material are required for the production of good settling activated sludge. High concentrations of monovalent cations, such as sodium, potassium, and ammonium, can interfere with these interactions. Symptoms of a cation imbalance are low floc strength (i.e., flocs that are susceptible to shear), poor sludge thickening and dewatering, decreased settling velocity, and reduced average floc diameter.

The ratio of monovalent to divalent cations (M/D ratio) is used within the literature to describe the cation balance within an activated sludge sample. In the March 1997 article published in *Water Environment Research*, "The effects of cations on the settling and dewatering of activated sludges: Laboratory results," M. Higgins and J. Novak identified and M/D ratio of less than two to one on an equivalent basis to promote good activated sludge settling. However, site-specific wastewater characteristics likely dictate the threshold M/D ratio for activated sludge deflocculation. Regardless, at relevant M/D ratios, a reduction in monovalent cations or addition of multivalent cations may improve settling.

Recommended parameters for plant operation

Constituent	Parameter	Recommended range
Activated sludge settling: sodium	M/D ratio	≤ 2.0[1] ≤ 15.0[2]
Digester biological process toxicity: sodium	Sodium (ppm)	≤ 5000
Digester biological process toxicity: sulfide	Specific biogas production rate (ft^3 per lb volatile solids fed)	10-12
Digester substrate competition: sulfate	COD–sulfate ratio	≥ 15
Digester gas handling: sulfide	hydrogen sulfide (ppm)	< 3000
Final effluent discharge permit: sulfate	Sulfate (ppm)	< 1860

M/D = monovalent to divalent ion
[1] Threshold to impart sensitivity to variations in cation loading or other episodic events
[2] Threshold to cause sludge deflocculation and activated sludge clarifier failure

Based on October and December 2009 field measurements, the M/D ratio was 3.54 and 2.11, respectively. District staff noted that sporadic activated sludge settling upset events have occurred, most recently in July 2009. These two pieces of information suggests that:

- Variability exists in cation loading to the Main Plant such that the M/D ratio is observed to vary over time
- The district's clarifiers are operating on the edge of their performance capability with respect to mixed liquor cation balances.

Bench-scale testing revealed that the district's site-specific M/D ratio threshold at which activated sludge settling and effluent TSS are affected is 15 M/D (under the controlled conditions of the bench-scale study). This threshold is significantly higher than the literature values (less than two). It is possible that the long-term exposure of

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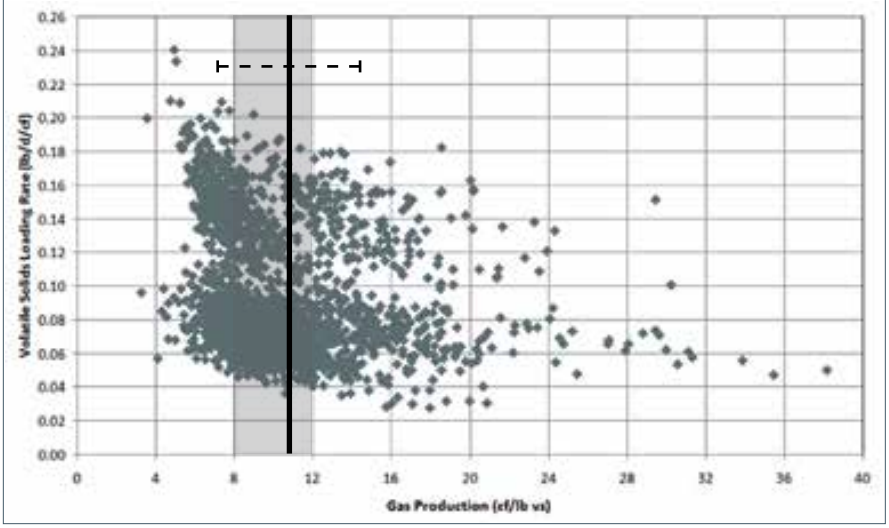
Figure 1. Biogas production rates over the last ten years of operation
Vertical black line represents average of all values and horizontal dotted line represents a two standard deviation range of the data centered on the average. The gray shaded area represents a typical range of biogas production.



the district's biomass to elevate sodium levels may have decreased its sensitivity to sodium-induced poor settleability over time.

A conservative projection of M/D ratios at the 17% and 40% loading increases is 4.15 and 4.96 M/D, respectively. The site-specific threshold would indicate this increase would not routinely upset the settling characteristics. However, persistent increases and fluctuations in M/D ratio are likely to impart additional sensitivity to clarifier performance.

Solids substrate competition

On the solids side of the plant, the district examined how the sodium sulfate could affect anaerobic digestion because methane formers and sulfate reducers compete for organic material. Thus, if the influent sulfate concentration is sufficiently high relative to influent chemical oxygen demand (COD) the methane formers are starved for organics.

In the 1991 article, "Competition and inhibition of sulfate reducers and methane producers in anaerobic treatment," in *Water Science and Technology*, E. Choi and J.M. Rim determined that sulfate-reducing bacteria activity was not significant above a COD-to-sulfate ratio of 13.3, and the recommended threshold for acceptable biological process operation and performance in an anaerobic digester is a ratio greater than 15. Similar findings have been reported throughout the literature.

COD loading to the anaerobic digesters is sufficiently high such that the COD-to-sulfate ratio characteristically remains above 60 under current plant operation. At 17% and 40% increases in Rhodia discharge, projected COD-to-sulfate ratios are 53 and 45, respectively, and thus, no reduction in methane production as a result of substrate competition with sulfate-reducing bacteria is expected.

Solids biological process toxicity

The district also needed to determine if either the dissolved sodium or sulfide species could become toxic to the digesters.

Sodium. The literature search showed that anaerobic digestion is operable with sodium concentrations in excess of 5 g/L with some loss of methane production and an accumulation of volatile acids. The sodium concentration in the district's anaerobic digesters is currently less than one-twentieth of this recommended threshold value. Even at the 17% and 40% increases, projected anaerobic digester sodium concentrations are 350 ppm and 400 ppm, respectively. These concentrations are significantly below the

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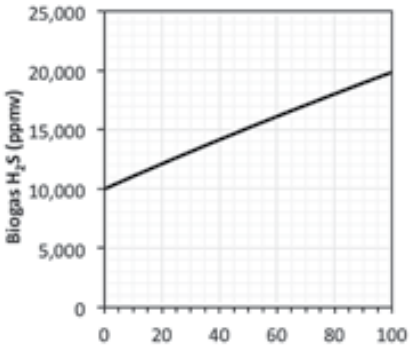
Figure 2. Projected average biogas hydrogen sulfide concentrations without intervention



threshold for sodium toxicity. Therefore, the district expects no negative effects based on sodium concentration.

Sulfate. In the digesters, the sulfate-reducing bacteria convert virtually 100% of the sulfate to sulfide. The sulfide will be partitioned among dissolved chemical species, chemical precipitates, and digester biogas.

Dissolved free sulfide is toxic to methane-forming organisms. Generally, because the concentration of hydrogen sulfide in biogas is related to the unbound dissolved sulfide concentration, one can expect a reduction of methane production to decrease as the concentration of hydrogen sulfide in the biogas increases.

Historical data show that the district's digesters produce biogas at a rate at or slightly above that of typical anaerobic digesters, at approximately 0.6 m^3 of biogas per kg (10 ft^3 of biogas per lb) of volatile solids fed to the digester (see Figure 1).

At 17% and 40% increases in Rhodia discharge, projected biogas hydrogen sulfide concentrations are 11,900 ppm and 14,200 ppm, respectively (See Figure 2). In the 1987 article, "Sulfide and sulfate inhibition of methanogenesis" in the September issue of *Water Research*, Karhadkar *et al* proposed a correlation between methane production efficiency and biogas hydrogen sulfide concentration. Based on this correlation the district predicted a potential methane production reduction of up to 4%.

Biogas hydrogen sulfide corrosion

The district examined locations within the plant where added hydrogen sulfide could cause problems. In particular, the district was concerned about the accumulation of crystalline deposits throughout the biogas handling system. These deposits are believed to be caused by the oxidation of hydrogen sulfide in the presence of other volatile compounds and subsequent condensation on and corrosion of metal surfaces.

For example, the hot gas tubes that serve the combination boiler/heat-exchanger units operate on hot boiler flue gas from biogas combustion and over time developed a coating of a white powdery substance similar in appearance to fresh snow. At first, the material was easy to wash away and is readily soluble in water. If allowed to accumulate, the deposits would tend to harden and become impacted in the various crevices of the heat exchanger's tubes and intake plenum. The hot gas tubes are cleaned once per month – increased from quarterly before Rhodia's discharge began – to prevent hardening of deposits. The district had to replace these tubes once every 1.5 to 3 years, an increase in frequency from once every five to seven years before the Rhodia discharge began.

Digester mixing in the primary digesters is performed by drawing, compressing, and re-injecting biogas using liquid ring compressors. Crystalline deposits would occur within the compressors' casing. Plugging and pitting corrosion necessitated replacement of the compressors at frequency of one to two years. The compressors were offline between 25% and 30% of the time resulting in interruptions in digester mixing and corresponding decreases in digester performance.

Based on the corrosion damage and the required maintenance, the district knew that the plant had reached its practical limit for sulfate loadings. Any increases in TDS and sulfate loadings would be likely to worsen these effects if corrective action had not been implemented.

Building the solution

The district and its consultant determined that increased sodium sulfate and TDS loadings would not affect the plant's

biological performance in terms of removal of BOD and ammonia removal and stable digester operation. The table shows the recommended operating parameters for sodium sulfate derived constituents at the district's Main Plant. The effects on the biogas system required action.

The solution was to add a ferric chloride delivery system to the plant's primary clarifiers and activated sludge process (points where sludge is generated within the plant). Ferric chloride addition increases the sulfide sequestration capacity of the biosolids, thus reducing the occurrence of hydrogen sulfide in the biogas.

The system was built to allow dosing to any of the plant's three banks of primary clarifiers and its tertiary activated sludge clarifiers. The chemical delivery system allows operators to adjust chemical usage based on the desired biogas hydrogen sulfide concentration as well as to use the ferric chloride as a coagulant in the event of future upsets to activated sludge settling.

Under routine operation for hydrogen sulfide control, ferric chloride is dosed to the primary clarifier bank that receives the bulk of the districts flow; however, ferric chloride can be dosed to any of the three banks of primary clarifiers or the activated sludge clarifiers.

Ironing out the process

Upon addition to the primary clarifiers, ferric chloride either binds to hydroxide or phosphate anions or organic material. The ferric containing complexes then settle and are collected as either primary or waste-activated sludge and fed to the anaerobic digesters. No sulfur is sequestered in the liquid-side treatment train by the addition of ferric chloride, thus no reduction in plant effluent sulfate is anticipated via chemical addition.

However, as well as forming the precipitates, the chemical also enhances sludge settling by adjusting the monovalent–divalent ratio toward the divalent end. (Technically, ferric iron is trivalent, but the effect is the same.)

Once in the anaerobic digester, ferric iron is reduced to ferrous iron, thereby breaking the organic, hydroxide, and phosphate complexes and resulting in the release of free ferrous iron cations. Ferrous iron exhibits a strong affinity for dissolved sulfide, and complexes to form iron (II) sulfide. Iron sulfide is an insoluble black-colored precipitate that is characteristic of anaerobically digested sludges, giving these sludges their characteristic black color.

The chemistry of sulfide sequestration with ferrous iron is well defined in anaerobic digesters. An appropriate ferric dose can be prescribed based on projected increases in sulfate loading and the desired extent of hydrogen sulfide removal from the biogas.

Realistically, complete removal is not necessary to achieve the desired benefits of substantially reduced maintenance and operational difficulty related to the biogas handling systems, so the 3000-ppm target was included as a middle-ground to balance the reduced maintenance needs with the increased chemical demands.

The district is using a 38% (by weight) solution of ferric chloride. Expected volumetric demands of ferric chloride solution to achieve the goal of largely mitigating the impacts of sulfate loading on the district's biogas system are between 380 and 530 L/d (100 and 140 gal/d).

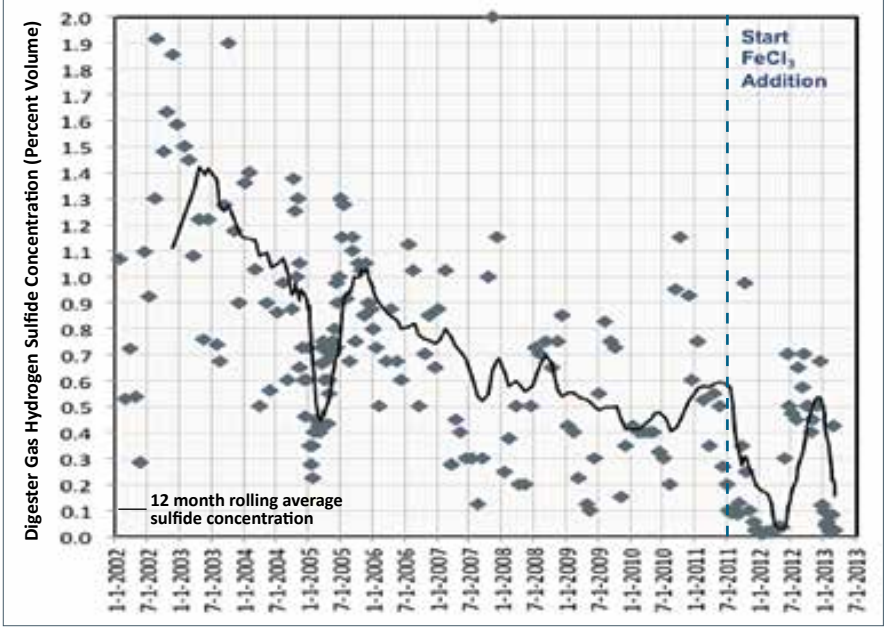
Success so far

On June 23 2011, the operators began dosing ferric chloride to the district's primary clarifiers. An enhanced monitoring program currently is being implemented to assess the health of the digestion process and the effectiveness of ferric dosages. The tests have shown that the chemical addition has had no effects on digester performance in terms of volatile solids reduction, biogas generation, or organic acid accumulation.

Figure 3 shows the digester gas hydrogen sulfide concentrations measured immediately upstream of the combination boiler/heat exchangers. Since chemical addition began, concentrations have been consistently lower than at any time in the past 10 years. Dry weather periods during the summers of 2011 and 2012 have corresponded to increased sulfur transfer to the anaerobic digesters, requiring intermittently increased ferric chloride dosing to control hydrogen sulfide production. The source of this increased sulfur loading to the digesters (whether domestic or industrial) and the mechanism of transfer to the digester is under ongoing investigation.

Overall, operations and maintenance staff members also have reported that the accumulation of crystalline deposits within the hot gas tubes has diminished substantially as the hydrogen sulfide concentrations dropped, reducing scheduled maintenance frequencies and equipment downtime. CS

Figure 3. Digester gas hydrogen sulfide concentrations



Christopher Wilson and David Hobbs are associates at Greeley and Hansen (Chicago, IL). John McDonnell is the district engineer, Jennifer Hindel is the executive director, and Debby Martch is laboratory director at the Thorn Creek Basin Sanitary district (Chicago Heights, IL).

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Columbus Wastewater Treatment Facility

Influent Pump Replacement Yields Energy Savings

By Dave Arnott, P.E., Ruekert/Mielke, Inc. and Jim Johnson ITT Flygt Corporation

Introduction and background

The City of Columbus is located in Columbia and Dodge Counties. The treatment facility serves the City of Columbus, Village of Fall River and the Town of Elba with a combined population of approximately 6,000.

The average daily flow to the facility is approximately 0.8 million gallons per day (MGD). Organic loading is approximately 1,350 pounds of biochemical oxygen demand (BOD) per day.

The treatment facility consists of an extended aeration, single-stage activated sludge process. Solids are aerobically digested, thickened to 16 percent solids, and stored in a storage building for ultimate application on farm fields as a soil amendment.

The treatment facility was constructed in 1984. Due to several bypass events in the 2000s, the city has recently invested money to reduce infiltration and inflow (I/I) in the collection system and to make changes at the treatment facility to allow blending during and after extreme wet weather events. The updates to the treatment facility took place in 2011. As part of this project, the influent pumps were replaced to allow for additional capacity.

Before the upgrade, there were five Aurora vertical line shaft influent pumps. Each pump was 25 Hp and was rated at 1.3 MGD. One variable speed drive was provided and could be connected to one of two pumps through the pump controls. The pumps conveyed wastewater from an adjacent two-section concrete wet well. These pumps were at the end of their service life with badly worn impellers and mechanical seals that leaked significantly. In addition, maintenance and safety were concerns for the city as the couplings requiring periodic lubrication and alignment were located high above the pump room floor.

The city chose to replace two of the five influent pumps with dry-pit submersible-style pumps. With the dry-pit submersible design, the pump and motor assembly are no longer separated by a shaft. The assembly can be submerged without damage.

The new pumps selected were Flygt 12-inch model NT-3202. Each pump is rated at 3.67 MGD at 47 feet total dynamic head with a 45 Hp motor equipped with a variable speed drive. Each pump has a closed loop cooling system. Due to the submersible design, a pressurized seal water is not needed.

These pumps are significantly larger than the old pumps. With the largest pump out of service (one of the two new pumps), the firm capacity of the influent pump station is 7.0 MGD, which is also the current peak hour flow capacity of the plant. For normal flow, the two new pumps alternate and the older backup pumps are not needed. In the future, a third, identical pump will be provided to replace the existing older pumps. The firm capacity of this configuration with two out of three pumps operating will be 7.5 MGD.

Photograph 1 shows the old pumps. Photograph 2 shows a new vertical-mounted dry-pit submersible pump.

Other improvements related to the influent pumps as part of this project included replacing the pump controls, installing a second parallel force main to keep velocities reduced at peak flows, replacing an influent magnetic flow meter, replacing fittings that reduced the force main size from 16-inch diameter to 10-inch diameter at the flow meter, and installing a wet well flushing system.

The new pumps incorporated a specialty impeller design by Flygt. The impeller uses a semi-open, back-swept impeller designed to clear rags and debris better than the tradition non-clog sewage pump. The original design of the impeller was to reduce pump clogging. However, several years after this impeller was introduced to the market, Flygt noticed an additional benefit of reduced energy usage due to debris not catching and accumulating on the impeller. With this impeller design, Flygt guaranteed a minimum energy savings reduction of 25% compared to the old Aurora pumps. This was another factor in the selection of this pump. The guaranteed energy savings also helped enhance grant funding for the project, which totaled 30 percent principal forgiveness.

The City of Columbus is a public power community and is part of WPPI Energy. WPPI worked cooperatively before and after the influent pump replacement to document the amount of power the old and new pumps were using. Specific services of WPPI included: providing and troubleshooting the installation of meters connected to the pumps, downloading power data from the meter to their field computers, and compiling the power information in tabular and graphical format.

PHOTO 1: OLD PUMPS

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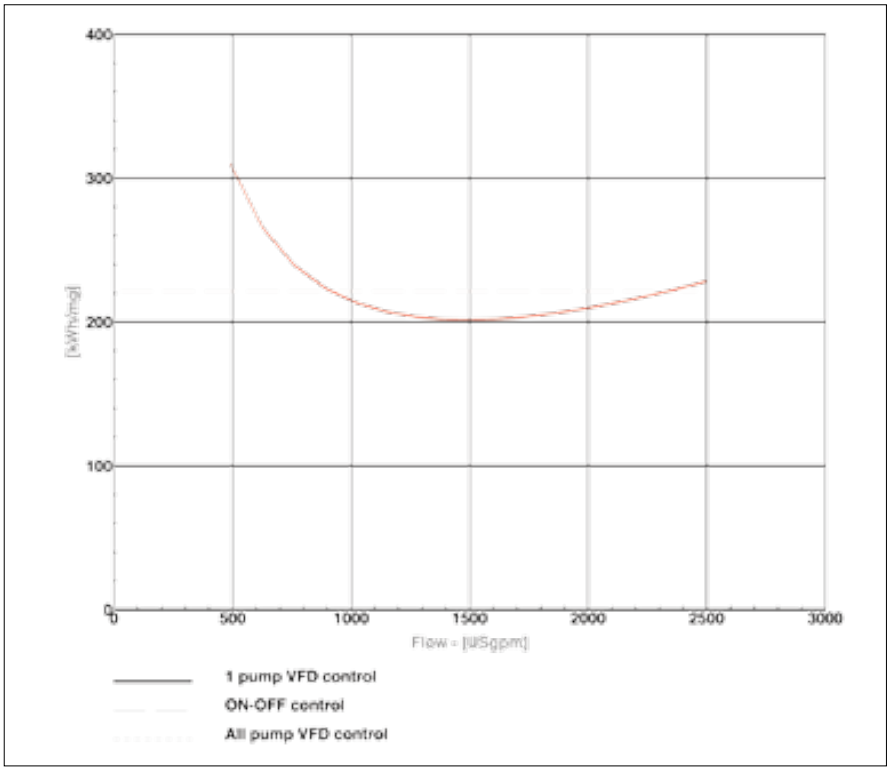
FIGURE 1: VFD-ANALYSIS – SPECIFIC ENERGY



Methodology

The energy comparison was conducted on the basis of specific energy – the amount of energy required to pump a given volume of water.

Old pump energy monitoring

WPPI conducted testing on the blowers used for aeration in late winter of 2011. Since the blowers were set up with an existing energy use meter, an influent pump was monitored after the aeration blower monitoring. An old pump was monitored without the use of a variable speed drive pump motor. The old pump conveyed approximately 900 gallons per minute.

The month of March was used for energy and flow monitoring. The last half of the month was very wet, and more than one pump was operating for most of the second half of the month. The pumping data had to be limited to days when only one pump was operating since it was not clear how much of the total volume was pumped from the one pump with the energy meter on it. The pump controls were set so that the pump with the energy meter would be the lead pump for all cycles.

The total volume from the monitoring period was 11.95 MG. The total energy was 2295.2 kW-Hr for a specific energy of 192 kW-Hr per MG.

New pump energy monitoring

After the new pumps, controls, flow meter, force main, and flushing system were installed, one new pump was tested for specific energy. To eliminate differences compared to the old condition, the new 10-inch diameter parallel force main was isolated and pumping took place exclusively through the existing 16-inch force main. In addition, with the wet well flushing system and new pumps, a portion of the pumped wastewater was routed back to the wet well at a high velocity without flow metering for approximately two to three minutes twice per day. The flushing system was disabled so that wastewater would not be rerouted back to the wet well during the test period. The pump controls were set to ensure the same pump started for each pump cycle. The test period took place from late December 2011 to early January 2012.

PHOTO 2: NEW VERTICAL-MOUNTED DRY-PIT SUBMERSIBLE PUMP

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"UPON A REVIEW OF THE TESTING METHODOLOGY, IT WAS CLEAR THAT THERE WERE TWO VARIABLES THAT CHANGED FROM THE OLD PUMPS TO THE NEW PUMPS. THESE WERE THE PUMPS CONTROLS AND THE FLOW METER."

FIGURE 2: COLUMBUS WWTP RAW PUMP 1 – NEW PUMP AND VFD

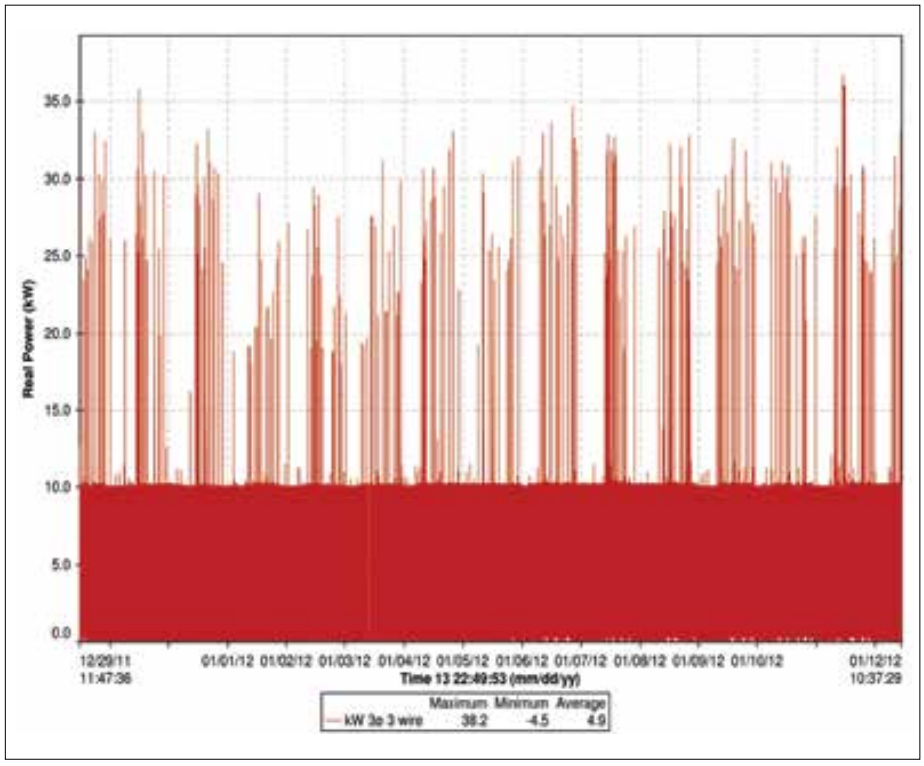
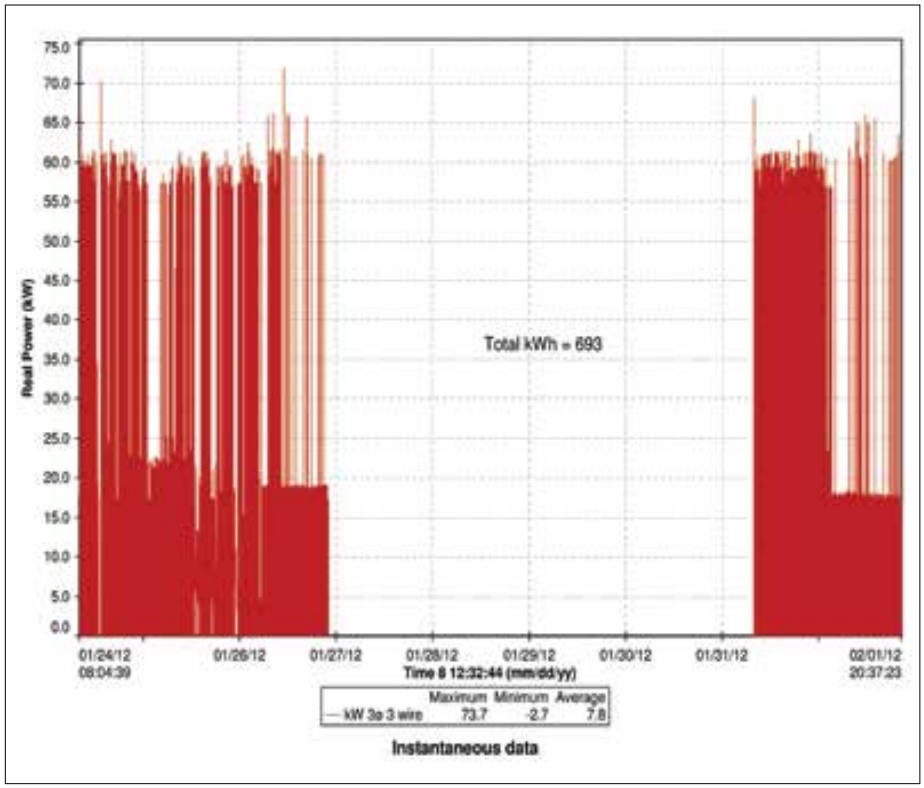


FIGURE 2: COLUMBUS WWTP RAW PUMP 4



The pump motor variable speed drive (VFD) was used for this testing. The new pumps were equipped with VFDs to extend their runtime. Energy savings was not expected from the VFDs since the total dynamic head was dominated by static head. The minimum speed of the VFDs was set to approach the minimum specific energy based on manufacturer pump test information. In general, VFDs have a minimum speed below which a pump will use *more* specific energy compared to an across-the-line configuration. Figure 1 depicts the specific energy of this pump as a function of the pumping rate in gallons per minute. The minimum speed was 42 Hz, which corresponded to a pumping rate of approximately 1,100 gallons per minute. Even at this minimum pumping rate, the pump would cycle on and off. As flow rates increase to the Columbus treatment facility, pump run times will be extended.

Figure 2 shows the power readings for this test period. The total volume from the monitoring was 9.14 MG. The total energy equaled 1636.4 kW-Hr for a specific energy of 179.0 kW-Hr per MG.

Comparing the old pumps and the new pumps, the specific energy was reduced from 192 kW-Hr per MG to 179.0 kW-Hr per MG. This represented a decrease of approximately seven percent – well off the guaranteed level of 25 percent.

Upon a review of the testing methodology, it was clear that there were two variables that changed from the old pumps to the new pumps. These were the pumps controls and the flow meter. It was plausible that the pump control elevations could be slightly different with the new control configuration, which would impact the static head. In addition, it was plausible that there were differences in the flow meter accuracy. Since the new flow meter was factory calibrated, the city felt that the new flow meter was more accurate than the old flow meter. It was decided to re-test an old influent pump with the new controls and the new flow meter.

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"THE ENERGY SAVINGS FROM THE REDUCED SPECIFIC PUMPING ENERGY AND REDUCED PEAK-HOUR CHARGES IS ANTICIPATED TO SAVE THE CITY APPROXIMATELY $2,000 TO $3,000 PER YEAR."

Old pump energy monitoring – retest

The retest of the old pumps was set up to take pace in late January 2012. The energy meter was placed on one old pump, and the pump controls were set up to make this pump the lead pump for all cycles. There were never any times during the test period where more than one pump was needed. For this test period, the second force main was not used and the wet well flushing system was disabled. Figure 3 depicts the power readings for this test period.

WPPI experienced a problem with their meter from January 27 to January 31, omitting energy data from this time period. The total volume for the monitoring period, subtracting off the flow from when energy usage was not available, was 2.67 MG. The total energy was 693 kW-Hr for a specific energy of 259 kW-Hr per MG.

Results and conclusions

When the flow meter and pump control elevation variables were eliminated as differences in the testing methodology, there was a more pronounced difference in specific energy of the pumps. The specific energy was reduced from 259 kW-Hr per MG with the old pumps to 179 kW-Hr per MG with the new pumps. This represents a decrease of approximately 31 percent. This is in excess of the manufacturer-guaranteed level of 25 percent energy reduction.

In addition, comparing Figures 2 and 3, it is clear that the peak power demand decreased significantly with the new pumps. Figure 1 with the new pumps using variable speed drives shows a peak power demand of 30 kW. The peaks shown in Figure 2 are associated with the step screen operation and industrial discharges in the collection system. Figure 3 represents the old pump with a peak power demand of 60 kW.

The energy savings from the reduced specific pumping energy and reduced peak-hour charges is anticipated to save the city approximately $2,000 to $3,000 per year.

The city also saved money on maintenance. The new pumps no longer require shaft alignment checks and coupling lubrication. This task required a significant amount of time since the couplings were located high off the pump room floor. With dry-pit pumps, there is a pressurized seal water system to maintain. With the new dry-pit submersible style pumps, there is no need for a pressurized seal water system. CS

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STUDENT PAPER

Closing the Loop on PET Recycling – Fitchburg, WI

Prepared by Sally Shumaker, Daniel Schwartz, Benjamin Kultgen, & Antonio Garcia

Introduction

For over 45 years, Placon Corporation in Fitchburg, Wisconsin has been a leading designer and manufacturer of innovative custom and stock thermoformed packaging products as well as premium, recycled flake and extruded roll stock materials for the retail, food and medical markets. Continuously setting the bar in thermoformed packaging and environmentally conscious material solutions, Placon provides thin gauge, rigid plastic packaging products that harness the power of tomorrow's technology and design to solve customers' challenges today. Placon is also an industry leader in achieving environmental efficiency and is focused on using recycled PET to operate sustainably.

The recycling of PET bottles is an important practice in sustainability, as it reduces landfill waste and the amount of petrochemical derivatives required to produce new PET. In an effort to be at the forefront its field, Placon Corporation constructed a 36,000 square foot recycling facility in 2011, dubbed their EcoStar® Plastics division. The EcoStar® division sorts, washes and grinds post-consumer PET bottles so that they can be processed into new plastic sheeting and containers. Though this facility is reducing the amount of plastic bottles that are accumulating in landfills, it does not currently meet Placon's zero waste to landfill goal. Given the overall purpose of reducing the environmental footprint of the corporation, Placon is interested in increasing its EcoStar® division's water and energy efficiency while also reducing or eliminating its label, grinder, and wastewater sludge waste streams produced during the multiple washing steps and material separations.

Preliminary investigation

The current recycling process is very water efficient, however wastewater treatment is minimal. Plastic and paper particles greater than 1mm in diameter are screened off and disposed of as solid waste, while the water is pH adjusted with sulfuric acid before being discharged to the local Madison Municipal Sewage System for treatment.

After analyzing P&ID's and other pertinent documents, the UW-Madison CSWEA student chapter, or UWCS for short, determined that reducing EcoStar®'s fresh water consumption would not likely be cost-effective for Placon Corporation. After analyzing EcoStar®'s quarterly MMSD water quality tests and bills, however, it was determined that a significant amount of money could be saved by reducing the concentration of TSS (total suspended solids) in EcoStar®'s wastewater effluent. UWCS thus designed four different systems for TSS removal: an inclined plate clarifier, a hydrocyclone, a dissolved air flotation unit, and an anaerobic

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digester. UWCS also designed an equalization tank to precede any of these systems and ensure consistent operation and performance. Finally, a solids conveyor system was designed to carry separated solids to a separately proposed solids dewatering area. All treatment systems were designed to accommodate 100-150% of the EcoStar® facility's historical average flow (21 gpm) and contaminant concentration (~3300 mg/L TSS.)

Project constraints

UWCS has attempted to emulate Placon Corporation's environmental values while incorporating the following constraints into the design process.

- Ensure 2-3 year payback period for complete treatment system.
- Limit the footprint of treatment system to a 25' x 14' space in the current pH adjustment area.
- Abide by City of Fitchburg sewage ordinances.

Proposed treatment options

UWCS has designed four different systems for TSS treatment: an inclined plate clarifier, a hydrocyclone, a dissolved air flotation unit, and an anaerobic digester. To ensure consistent operation and improved performance in all of these systems, UWCS has designed an equalization tank to precede any of these systems as well. All treatment systems have been designed to accommodate 100-150% of the aforementioned historical average flow (21 gpm) and contaminant concentration (~3300 mg/L TSS) data provided by Placon Corporation.

Inclined plate (Lamella) clarifier

Inclined plate clarifiers use gravity to separate settleable solids from liquids, in most cases without the use of coagulation chemicals (when particles size is greater than 50 microns) [13]. In inclined plate clarifiers, water flows upwards through a series of plates inclined 45 to 60 degrees from horizontal and spaced about two inches apart. Solids settle onto these plates and flow downwards into a sludge hopper to be compacted by a screw press, while clear water exits the top of the plate area and overflows an adjustable weir [11].

Inclined plate clarifiers have many advantages over traditional sedimentation tanks. Because suspended solids only need to settle an inch or two, inclined plate clarifiers are capable of removing suspended particles much more quickly and efficiently, saving upwards of 85% of the space typically required by traditional sedimentation basins (which is important due to the limited space in the EcoStar® facility). Furthermore, inclined plate separators require no moving parts other than a water pump unless fitted with a screw press or other sludge thickening device in the hopper system. This results in these systems' high energy efficiencies and low cost [11]. According to preliminary tests, a properly sized inclined plate separator could potentially remove more than 75% of the TSS from EcoStar®'s wastewater.

Hydrocyclone

Hydrocyclones are simple devices that employ centrifugal force to separate solid particles from wastewater. This method of removing suspended solids is advantageous because the unit involves no moving parts and therefore will require limited maintenance. Hydrocyclones typically have a very small footprint, making them practical for the space at Placon.

Hydrocyclones can typically remove particles that range between 40 and 400 microns in diameter; after separation, the underflow is rich in solids (generally 50-53% by volume) [2]. These numbers are critically dependent on the specific gravity of the solids present in the wastewater, however, as is the percent of solids removed. Thus the effectiveness of this system could vary significantly with minor variations in PET bale quality.

Dissolved air floatation (DAF)

A final TSS treatment option is a dissolved air flotation system. In a DAF system, a chemical coagulant is mixed into the wastewater to encourage flocculation of suspended solids. This treated water is then pumped into a tank and injected with diffused air; the wastewater is held under this pressure, either in pipes or a retention tank, for a few minutes to allow the air to dissolve into the water [15]. A pressure release valve later reduces the pressure, allowing the dissolved air to come out of solution. Tiny bubbles form and adhere to flocked solids as they float to the surface, where the solids are then scraped off. Finally, clean water is discharged out of the bottom of the tank. A DAF system, when operating properly, could potentially remove nearly 100% of the suspended solids; furthermore, DAF systems are proven in the recycling industry [3].

Anaerobic digestion

In order to achieve more complete wastewater treatment, UWCS researched anaerobic digestion technology to provide a fourth treatment option. UWCS understands that the addition of an anaerobic digester to the wastewater treatment train does not fall within Placon Corporation's current financial and/or space constraints; that being said, UWCS wishes to present this innovative treatment option as a possibility for any future environmental initiatives. The anaerobic digestion process would require a very large initial investment, but it would make for a more complete wastewater treatment system when implemented in conjunction with any of the previous three devices.

Anaerobic digestion is a natural process in which bacteria break down organic matter in an oxygen deprived environment to form biogas and digestate. This process requires four different phases: pre-treatment, digestion, biogas processing and utilization, and disposal or reuse of solid waste. As previously alluded to, pre-treatment to remove suspended solids and other particle debris could be performed by any one of the three proposed treatment systems previously mentioned. Overall, anaerobic digestion provides environmental and public health benefits including greenhouse gas abate-

	Inclined Plate Clarifier	Hydrocyclone	DAF	Anaerobic Digestion
Cost	4	5	3	1
Effectiveness	4	2	5	5
Operations/maintenance	5	4	2	1
Footprint	5	5	2	1
Zero to landfill objective	2	2	2	4
Sustainability/Longevity	4	3	3	4
Total	**24**	**21**	**17**	**16**

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ment, organic waste reduction, odor reduction, and pathogen destruction [17]. This process is also a carbon-neutral technology as the captured biogas can be used for heating, electricity generation, or other related applications. Expected savings from one of these devices could be as high as 85% of the entire sewage fees currently being incurred, totaling $102,000 per year. The solid digestate formed during digestion could be recycled or sold as well.

Final recommendation

UWCS recommends the implementation of an inclined plate clarifier, due to this system's simplicity and low operation/maintenance requirements, cost-effectiveness, and compact design. Given that the complete system's estimated payback period is under two years (including equalization tank, pumps, and solids conveyor system), the inclined plate clarifier meets Placon's constraints and should remove more than 75% of the total suspended solids from the wastewater. The estimated total cost of an inclined plate clarifier system, including equalization tank and solids conveyor system, is $71,350. CS

Sally Shumaker, Benjamin Kultgen, & Antonio Garcia

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STUDENT PAPER

System Design and Economical Study of Wastewater Reuse

for an Office Building Located in Downtown Milwaukee, Wisconsin

By Amanda Heller

Introduction

Water is an abused resource, and in many places it is lacking in quality and quantity. As more areas around the world are running out of water, including areas in the United States, it is important water is used as efficiently as possible. Currently, Milwaukee, Wisconsin has a large clean water source, Lake Michigan, whose water supply is protected by the Great Lakes Compact. However, this compact has already been compromised, and water from Lake Michigan is being pumped to areas where the flow does not naturally travel back into the body of water. The future may include lower water quality and quantities, leading to a decrease in water availability as well as an increase in the price for water.

This thesis includes a study between two low cost systems used in small-scale wastewater treatment applications, the membrane bioreactor and the constructed wetland. The study was completed for an office building located in downtown Milwaukee, WI, for the waste that is generated on-site. Both the membrane bioreactor and constructed wetland systems were applied to the office building's generation, and a cost analysis was performed between the two systems, including the payback periods.

Membrane bioreactor (MBR)

Membrane bioreactors (MBRs) are an efficient mechanical way to remove unwanted pollutants and bacteria from the wastewater stream. In simplest terms, an MBR is an activated sludge reactor combined with a microfiltration membrane [1, 2]. Several advantages come with the use of an MBR, such as a reduced footprint, high quality effluent, capability for high volumetric loading, and with the proper conditions within the MBR, a reduction in sludge yielding [2]. Several factors affect the efficiency of the MBR, including flow rate, feedwater quality, hydraulic retention time (HRT), solid retention time (SRT), the set-up of the system, and the types of membranes used [2, 3].

MBR system schematic

After all size requirements have been determined for the MBR, the general system layout in figure 1 illustrates the flow through the system. The design calculated the size and flow requirements for the different operating parts of the MBR, and Figure 1 illustrates the system process.

Constructed wetlands (CWs)

CWs are defined as "engineered or constructed wetlands that utilize natural processes involving wetland vegetation, soils, and their associated microbial assemblages" for the treatment of wastewater [4]. Constructed wetlands are a relatively simple technology with low operating costs and can be used in any area with a space large enough to support the system. The type of wetland, as well as the plants to be used for the treatment process, must be determined before the actual construction begins. These factors can affect the overall design.

CW system schematic

The CW system size has been defined and the schematic appears in Figure 2. The front ends of these two systems are identical up through the pumping of the constant flow into the system. After this initial portion, the differences in the two treatment systems appear.

MBR cost requirements

The MBR is an equipment, and maintenance, intensive treatment system compared to the CW. Therefore, there are many more mechanical pieces as well as operational and maintenance components associated with the system, increasing the total cost. The total physical MBR cost is $991,084, with yearly maintenance costs totaling $40,666 per year.

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CW cost requirements

The constructed wetland is a far less intensive system than the membrane bioreactor in construction costs, as well as in operational and maintenance costs. For the CW, the total construction costs equal $330,074, while the operation and maintenance of the system total $18,507. The CW treatment system is the least expensive in all aspects.

Return on investment (ROI) and life cycle cost analysis (LCCA)

A life cycle cost analysis was performed on both systems to determine how much the system would cost the office building until the point of payback. Each system acquisition cost was determined and added into year one. The following years included only the cost for worker time, and training, including a 3.5% discount factor on the equipment and a tax provision of 38%. The sum of the present values per year for each system (MBR and CW) was graphed over a period until payback, and is depicted in Figure 3 as "MBR" and "CW". A period of 20 years is typical for wastewater treatment systems to undergo upgrades. Therefore, every 20-year period a disposal amount of 10% of the acquisition cost was assumed. This may not be required as the system may be able to continue operation with upkeep.

An LCCA was also performed on the water that would be consumed from the city water works, as well as the water that would be discharged to the city sewer if the system was not implemented. The acquisition cost was determined by the amount of water each system reclaims multiplied by the purchase price of water per gallon from the city water works. The only other cost included in the LCCA for water usage was the disposal cost of water to the sewers. Both of these unit prices of dollars per gallon were multiplied by an increasing factor of 3% to plan for future cost increases which are near implementation [5]. The increase in dollars per gallon is to collect more money to be able to replace old water mains and infrastructure [5]. Currently, only the water works plans to increase rates, but this table includes an increase in discharge rates by 3% as well. A factor that was not included in this LCCA that may aid a slight amount in providing a reasonable ROI would be the incentives that the sewerage district may give by reducing the amount of water that is sent to the Milwaukee WWTP. This would provide another area

Figure 1 MBR layout and design requirements

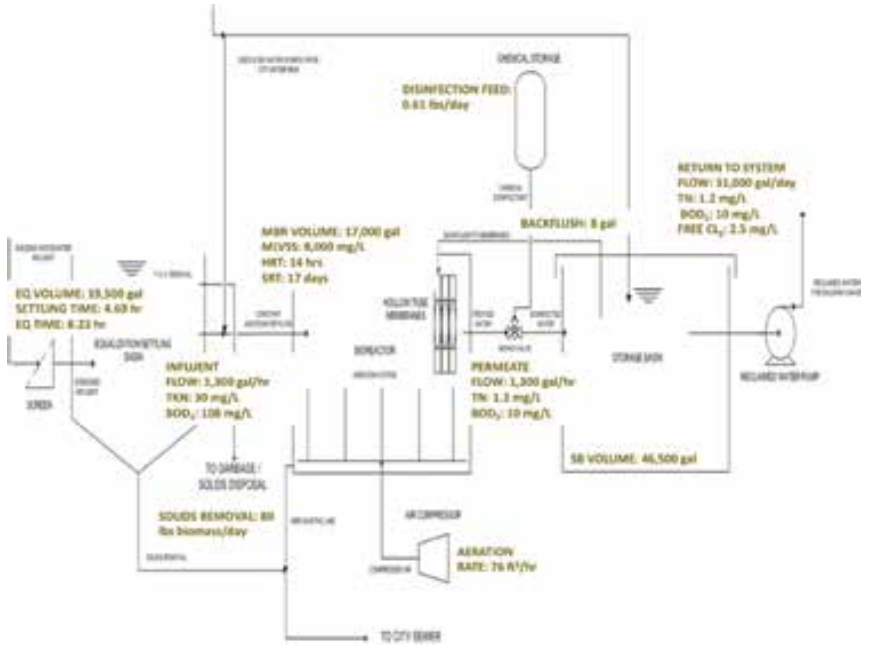
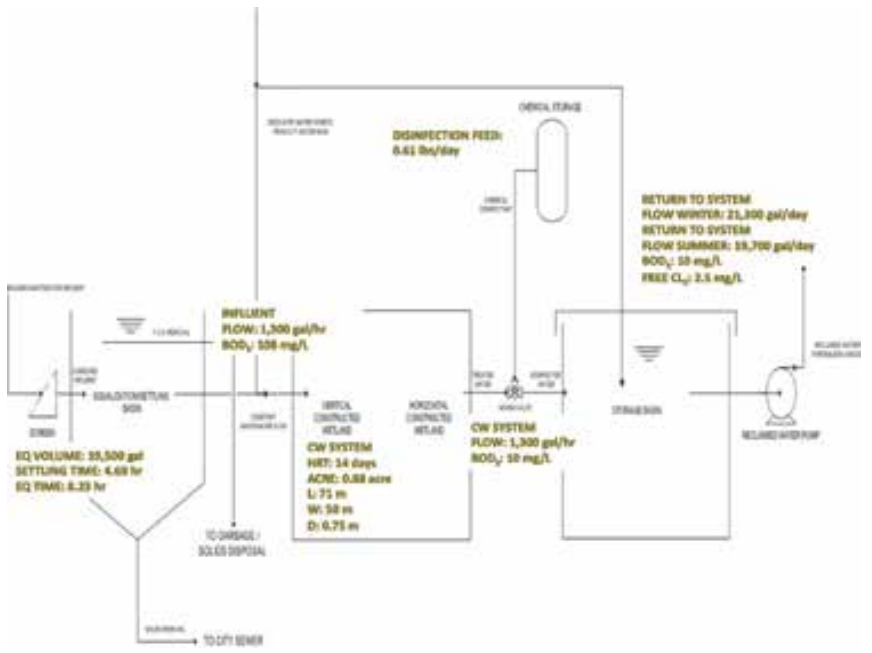


Figure 2 CW layout and design requirements



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of money savings that could decrease the time for system payback.

Figure 3 shows the LCCA graphs of each system: MBR, MBR Water Acquisition and Disposal, CW, and the CW Water Acquisition and Disposal. Where these two lifelines cross paths between respective system and acquisition indicates the amount of time to meet the ROI. The MBR has an ROI of approximately 53.5 years, as indicated in Figure 3, while the CW has an ROI of roughly 26.5 years of system operation.

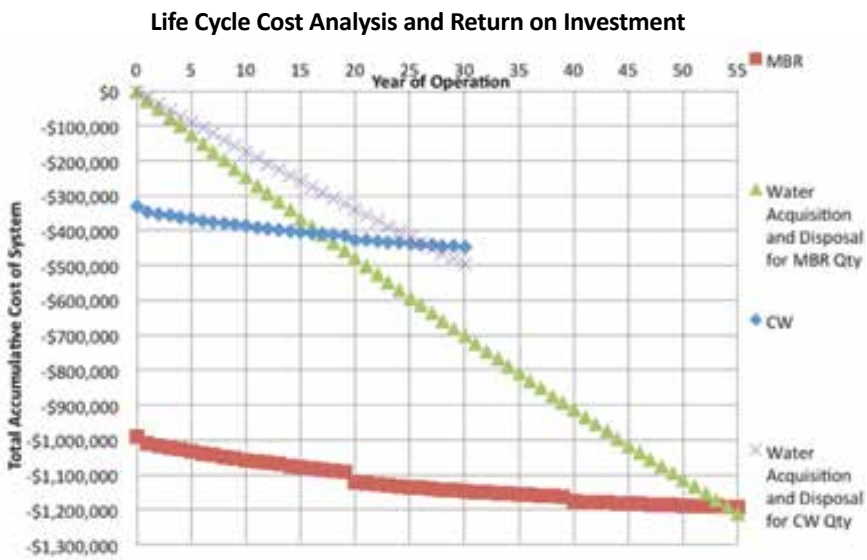
Final conclusion

Figure 3 illustrates well the large economic differences between the two systems. The MBR takes a significantly larger amount of finances to construct, operate and maintain throughout its lifecycle than the CW. The finances saved by the CW are much less than those saved by the MBR with the reclaimed water in acquisition and disposal costs. However, due to the large differences between system costs, the cost of water acquisition and disposal meets the LCCA curve on the CW well before the LCCA curve for the MBR. Therefore, the Constructed Wetland is the most economical on-site wastewater treatment system for water reuse in downtown Milwaukee.

Since neither system provides an appropriate ROI, the more economical system should then be based on cost of acquisition and operation. Even under this consideration, the CW is the most economical choice for an on-site wastewater treatment system when compared to an MBR.

Overall, each system is considered to be a low-cost, low-maintenance form of on-site wastewater treatment. Both systems can be implemented in downtown Milwaukee, Wisconsin, and both provide the quality of effluent water required by the EPA and the State of Wisconsin. However, when economics are introduced, even though neither system provides a reasonable ROI, the Constructed Wetland proves to be the most economical choice for on-site wastewater treatment when compared to the membrane bioreactor. CS

Figure 3 MBR and CW LCCA and ROI



Amanda Heller

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Opportunities Abound for IL Section

By Derek Wold

I promised myself that I wouldn't start my first chair message with a commentary about the weather. But, of course, Mother Nature did not cooperate. An epic storm that dumped up to eight inches of water over a two-day period left many communities under water and remains the talk of our industry in Illinois. Power outages and record flood levels were the story in Illinois in April. However, dealing with the damage and disruption caused during these difficult times also highlights the importance of organizations such as CSWEA. Over the past several months, I have heard many of our members sharing stories and ideas on how to clean up from this storm and prepare for events like this in the future. Reaching out to our network of industry experts for advice and guidance is yet another example of the value of CSWEA.

From wet and gloomy to a bright spot, I congratulate the Wisconsin section on hosting an excellent annual conference. Again, this was a great opportunity to network with colleagues from other states. The quality of the presentations was high as usual and special recognition to Trevor Ghylin for assembling the program. Thanks to everyone who made this year's conference a success. I hope to see everyone in Minnesota next year.

Thank you to Randy Wirtz for his invaluable leadership over the past year and spearheading our strategic planning effort. Although his direction will be missed, we are in good hands and offer congratulations to our new president, Patti Craddock. I would like to offer whatever support and assistance is needed from the Illinois Section.

The Illinois Section has a strong group of committees that offer educational and networking opportunities. I encourage anyone who is interested to get involved with the committees. Even if you only can spare a small amount of time, you will find the value received to be much more than what you put in. The Illinois Section committees and chairs for 2013 are listed on the next page.

Please contact me or any of the committee chairs to find out how you can get more involved.

One of the goals for this year is to increase membership. The first question is how do we go about doing this? So, I started thinking about how I became involved in Central States. Until about five years ago, I was lightly involved in the organization. I attended seminars and maybe the annual conference. Then Mark Eddington encouraged (ok, forced) me to join the collection system committee. I soon became chair of the committee and then second VP, as well as a member of the Technical Program Committee.

Thanks to Mark, not only for his leadership of the IL section over the past year, but also for getting me involved in CSWEA. It has been a rewarding experience through which I have grown professionally and been introduced to many new friends. So, my message is to think of just one person you know in the industry and encourage them to get involved. Bring that person to a seminar or social outing so they can get exposed to what Central States has to offer.

In addition to increasing membership, another goal for this year is to offer more training opportunities. I will be working with Mohammed and the committee chairs to identify ways to offer for training events throughout the year. Next up is the collection system seminar on June 27 at Aurora University which has outstanding speakers scheduled.

And speaking of training, WEFTEC 2013 is in Chicago from October 5-9, so put it on your calendar and get registered! The Exhibit Hall is complimentary with online registration. So, back to the message of getting more people involved, bring a co-worker who has never attended a CSWEA event. Bring a client, student or consulting engineer. Or, just bring someone else from the industry that would benefit from experiencing WEFTEC.

I am very excited to represent the Illinois Section as its chair and, like many of you, am looking to move CSWEA forward again this year. CS

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Illinois Section Officers And Committee Chairs 2013-14

SECTION CHAIR
Derek Wold, P.E.
Baxter and Woodman
708-478-2090
dwold@baxterwoodman.com

VICE CHAIR
Rich Hussey
LAI Ltd.
847-392-0990
rhussey@lai-ltd.com

2ND VICE CHAIR
Erik Lanphier
Glenbard Wastewater Authority
630-790-1901
elanphier@gbww.org

SECRETARY/TREASURER
Shelly Cumbow
Danville Sanitary District
217-442-3193
shellyc@danvillesanitary.com

TRUSTEE TO CSWEA '13
Dean Wiebenga
Peterson and Matz, Inc
847-624-5226
deanpmi@aol.org

IMMEDIATE PAST CHAIR
Mark Eddington
DeKalb Sanitary District
815-758-3513
meddington@dekalbsd.com

GOVERNMENT AFFAIRS CHAIR
Carl Fisher
Baxter & Woodman, Inc.
815-459-1260
cfisher@baxterwoodman.com

GOVERNMENT AFFAIRS VICE CHAIR
Tom Lentz
North Shore Sanitary District
847-623-6060
tolentz@northshoresanitary.org

COLLECTION SYSTEM CHAIR
Mathew Streicher, P.E.
Wheaton Sanitary District
630-668-1515
streicher@wsd.dst.il.us

COLLECTION SYSTEM VICE CHAIR
Zach Matyja
RJN, Inc.
630-682-4700
zmatyja@rjn.com

MEMBERSHIP CHAIR
Eddie McCall
HR Green
815-385-1778
emccall@hrgreen.com

SAFETY CO CHAIR
Dean M. Wiebenga
Peterson & Matz
847-844-4405
deanpmi@aol.com

SAFETY CO CHAIR
Doc Burke
AW Chesterton Seal
630-516-9090
burkew@chesterton.com

OPERATIONS CO CHAIR
Jim Huchel
City of Crystal Lake
815-459-2020 ext. 4168
jhuchel@crystallake.org

OPERATIONS CO CHAIR
Mandy Poole
Baxter and Woodman, Inc.
815-482-9155
apoole@baxterwoodman.com

PUBLIC EDUCATION CO CHAIR
Lee Melcher
Walter E. Duechler and Associates, Inc.
630-412-1235
lmelcher@deuchler.com

PUBLIC EDUCATION CO CHAIR
Zach Matyja
RJN Group, Inc.
630-682-4700
zmatyja@rjn.com

LABORATORY CHAIR
Mary Dressel
Dupage County Public Works
630-985-7400 ext. 203

LABORATORY VICE CHAIR
Stephan Hansen
Fox River Water Reclamation District
847-742-2068
shansen@frwrd.com

YOUNG PROFESSIONALS CHAIR
James Kerrigan, P.E.
Greeley and Hansen, LLC
312-558-9000
jkerrigan@greeley-hansen.com

STUDENT CHAIR
Michael G. Holland
DeKalb Sanitary District
815-758-3513
mholland@dekalbsd.com

INDUSTRIAL WASTES COMMITTEE CHAIR
Randy Patchett
Burns and McDonnell
630-724-3276
rpatchett@burnsmcd.com

INDUSTRIAL WASTES COMMITTEE VICE CHAIR
Ken Krueger
City of Crystal Lake
815-359-3700 ext. 4169
kkrueger@crystallake.org

BIOSOLIDS COMMITTEE CHAIR
Chris Buckley
Baxter & Woodman
815-459-1260
cbuckley@baxterwoodman.com

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Keep it Rolling

By Dave Arnott

As I write my first message as chair of the Wisconsin Section, I reflected on what makes our Section strong. To me, the answer is clear; it is our committees. The committee level is where ideas are conceived, coordination takes place and most of the work of the Section is completed. The committees are the engine of the Section. I am very proud of our committees and they work they do. The end product of our committees include but are not limited to: top-notch technical seminars, well-reasoned, technically sound commentary on a new regulatory initiatives, award nominations, public education and awareness initiatives, and grooming the next level of leaders in water environment through involving students and young professionals. All these are possible through the volunteer efforts of many individuals. We should never take for granted the high quality of work that takes place at the committee level. To all the committee members who have volunteered their time in support of committee charges, I sincerely thank you. You are the heart and the sole of our Section.

With the start of the 2013/2014 administrative year, Wisconsin Section has a large degree of turnover in our committee leadership and officer positions. Although, the transition period of the can be a little uncomfortable, in the end, I believe our Section will be stronger with new leaders, fresh perspectives and different ideas. Following is a brief summary of the changes.

Bill Oldenburg is taking over the Safety Committee from Jerry Hirt. Bill has a number of fresh ideas and some safety resources that he is ready to tap into. Thanks to Jerry for leading the committee for a number of years and helping to coordinate a safety topic at each of the two Collection Systems Seminars the last several years.

Sharon Thieszen is taking over for Dale Doerr for the Public Education and Awareness committee. Sharon will have her hands full with a number of responsibilities in the Strategic Plan while also serving as the WWOA liaison. Dale has been instrumental in the Stockholm Junior Water prize the last several years and has fine-tuned the program. We wish Dale good luck in his future endeavors.

Hans Holmberg is the new Government Affairs Committee Chair replacing Brandon Koltz. This is an intense committee and Hans brings a wealth of experience with his prior leadership from the Watershed Management Committee. Thanks to Brandon for his work in tracking regulatory initiatives such as the thermal rule, SSO rule and phosphorus rule.

Mark Mittag replaces Julie McMullin as the Chair of the Watershed Management committee. Mark will be an asset to the committee through his knowledge of watershed issues. Mark has been on the committee for many years. Julie is moving to the vice chair officer position. Thanks to Julie for starting the Watershed Webinar three years ago in conjunction with the Section Annual Business Meeting. This is another example of a high-quality seminar that our Section offers.

Bryan Viitala is taking over for Eric Lynne as leading the Students and Young Professionals committee. Eric helped to build and solidify our student chapters for the past four years. Bryan brings and energetic spirit, an outgoing personality and a wealth of contacts in the wastewater field to the chair position.

Lastly, Brandon Koltz is replacing Bill Marten as Section Trustee. Thanks to Bill for providing leadership to the Section in this role for the past two years. Brandon has been involved with this organization for many years and will fit in well as trustee.

To all the new committee chairs and officers, please do not hesitate to ask questions of the current Section leadership and past leadership. Many of the outgoing committee chairs have a wealth of knowledge that they would be happy to share. Let's make use of these great resources in the transition period.

New committee chairs and officers can expect a call from me encouraging them to attend the Central States Exchange (CSX) in Wisconsin Dells on July 25-26. This is a forum to exchange ideas with the Illinois and Minnesota Sections, share best practices at the committee level, and meet new people. After attending a couple of these sessions in the past, I have felt a renewed sense of purpose and mission in CSWEA.

In summary, I feel the engine of our Section, the committees, are in good hands. I am confident we will not skip a beat with the higher-than-normal level of changes. Let's keep it rolling! CS

"We should never take for granted the high quality of work that takes place at the committee level."

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Wisconsin Section Officers And Committee Chairs 2013-14

SECTION CHAIR
Dave Arnott
Ruekert-Mielke
262-542-5733
darnott@ruekert-mielke.com

VICE-CHAIR
Julie McMullin
Brown and Caldwell
414-203-2904
jmcmullin@brwncald.com

SECRETARY/TREASURER
Josh Gable
Centrisys
262-705-3064
josh.gable@centrisys.us

CSWEA TRUSTEE
Brandon Koltz
Brandon Koltz Water & Environmental Consulting LLC
414-453-6669
brandon.koltz@gmail.com

IMMEDIATE PAST CHAIR
Bill Oldenburg
New Water - Green Bay MSD
920-438-1079
boldenburg@gbmsd.org

GOVERNMENT AFFAIRS COMMITTEE CHAIR
Hans Holmberg
LimnoTech
715-808-0182
hholmberg@limno.com

COLLECTION SYSTEM COMMITTEE CHAIR
Randy Belanger
Visu-Sewer, Inc.
262-695-2340
rbelanger@visu-sewer.com

MEMBERSHIP COMMITTEE CHAIR
Jon Butt
Symbiont
414-291-8840
jon.butt@sybiontonline.com

SAFETY COMMITTEE CHAIR
Bill Oldenburg
New Water - Green Bay MSD
920-438-1079
boldenburg@gbmsd.org

OPERATIONS COMMITTEE CHAIR
Troy Larson
Strand Associates
608-251-4843
troy.larson@strand.com

PUBLIC EDUCATION & AWARENESS COMMITTEE CHAIR
Sharon Thieszen
City of Sheboygan
920-459-3464
sharon.thieszen@sheboyganwwtp.com

STUDENT/YOUNG PROFESSIONALS COMMITTEE CHAIR
Bryan Viitala
Mulcahy/Shaw Water
262-241-1199
bviitala@mulcahyshaw.com

WATERSHED MANAGEMENT CHAIR
Mark Mittag
Brown and Caldwell
414-273-8800
mmittag@brwncald.com

INDUSTRIAL WASTES COMMITTEE CHAIR
Mike O'Neil
Symbiont
414-291-8840
mike.oneil@symbiontonline.com

SPRING BIOSOLIDS SYMPOSIUM REPRESENTATIVE
Jay Kemp
AECOM Water
608-836-9800
jay.kemp@aecom.com

WWOA LIASON
Sharon Thieszen
City of Sheboygan
920-459-3464
sharon.thieszen@sheboyganwwtp.com

WWEA CHAIR
Tom Mulcahy
Mulcahy/Shaw Water
262-241-1199
tmulcahy@mulcahyshaw.com

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How Do We Adapt to Meet Changing Needs?

By Tracy Ekola

Our world is changing. Technology and innovation are driving change. As our world changes we can decide to follow along, fall behind, or be on the leading edge. Whatever we choose, change is inevitable.

Our world is filled with organizations. We work at for-profit or not-for-profit organizations. We rely on organizations to deliver the services we need – water, electricity, and sanitation. We depend on health organizations when we are sick. We use religious organizations to help our spiritual lives. We assume that most of our children's education will be delivered by formal education organizations. Organizations are everywhere. Organizations are how we get things done. And these organizations are changing – adapting to meet the changing needs of our world.

What is our organization doing to meet the needs of our changing environment and our changing membership?

CSWEA membership committees and past section board members have been preparing us for change. In my past role as the Membership Chair for the MN Section, I have experienced the changing focus and adaptation as our organization demographics change. WEF directives for Membership Committees and initiatives by CSWEA Past President Randy Wirtz are focused on changes to reinvigorate our membership. As well the purpose of the annual CSWEA-CSX (Committee and Section Exchange) meetings is focused on strategic planning and how our organization and organizational functions adapt to our changing needs.

As I transition into the chair position for the MN Section, I would like to continue to implement changes needed to continue to adapt to our changing world. Past Minnesota Section Chair Rob O'Connell reviewed proposed changes at the MN Section meeting held in May at the CSWEA Annual Meeting in Wisconsin. These changes include reinforcing and reinvigorating committees such as the membership committee or other committees whose objectives are most needed in our organization today. And reviewing committees that are no longer active or purpose is no longer as relevant to our current industry/organization's needs. These committee chairs/members are still needed, but may be better placed in other roles in our organization. Please feel free to contact me with your suggestions on these changes or to get involved – we need your involvement to ensure appropriate focus and implementation. Everyone is welcome to participate!

Please take a moment to review the CSWEA website including the committees and the Minnesota State Section Policy and Procedures Manual *(www.cswea.org/minnesota/governance/)*. We will provide further discussion to the Minnesota Section membership during the summer and leading up to our Annual Meeting at the Conference on the Environment to be held at the University of MN-St. Paul Campus on November 12, 2013. Planning is already under way for this conference. The 2012 Conference on the Environment was a great success and the upcoming 2013 conference promises the same based on the robust involvement at the recent planning committee meeting. Thank you to past MN Section chairs John Friel and Rob O'Connell who have done a great job leading the preparations of these events. In addition, the Operations Committee is also active in planning for the Innovative Conference on February 14, 2014 in St. Cloud. Tim Wedin is chair of the Operations Committee and leading the planning efforts for the Innovative Conference.

Many members deserve credit for dedicating their time and efforts to CSWEA and the MN Section. Involvement and participation by members and committee members is greatly appreciated and I want to take this opportunity to thank you! In addition, I would like to reach out and extend a welcome to ANYONE who wishes to become more involved; please contact me *(tekola@sehinc.com)* or Membership Committee Chair *(mstone@hrgreen.com)*. Thank you for the opportunity to serve as the MN Section Chair. I look forward to working with ALL of you. CS

"Organizations are changing – adapting to meet the changing needs of our world."

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Minnesota Section Officers And Committee Chairs 2013-14

SECTION CHAIR
Tracy Ekola
Short Elliott Hendrickson, Inc.
320-229-4406
tekola@sehinc.com

VICE CHAIR
Tracy Hodel
City of St. Cloud
320-225-7226
tracy.hodel@ci.stcloud.mn.us

SECRETARY/TREASURER
Alison Sumption
H. R. Green Company
651-644-4389
asumption@hrgreen.com

TRUSTEE TO CSWEA '14
Doug Henrichsen
Brown and Caldwell
651-468-2077
dhenrichsen@brwncald.com

IMMEDIATE PAST CHAIR
Rob O'Connell
TKDA
651-292-4591
robert.oconnell@tkda.com

GOVERNMENT AFFAIRS COMMITTEE CHAIR
Greg Johnson
Bolton & Menk
651-704-9970
gregjo@bolton-menk.com

COLLECTION SYSTEM COMMITTEE CO-CHAIRS
Todd Carlson
City of Duluth P.W. & Utilities
218-730-4051
tcarlson@ci.duluth.mn.us

Chris Kleist
City of Duluth P.W. & Utilities
218-730-4063
ckleist@ci.duluth.mn.us

INDUSTRIAL WASTES COMMITTEE CHAIR
Clay Watson
Gold'n Plump Poultry
320-240-6616
cwatson@goldnplump.com

MEMBERSHIP COMMITTEE CHAIR
Mark Stone
Howard R. Green Co.
651-659-7735
mstone@hrgreen.com

SAFETY COMMITTEE CHAIR
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OPERATIONS COMMITTEE CHAIR
Tim Wedin
LHB Corporation
612-752-6935
tim.wedin@LHBcorp.com

PUBLIC EDUCATION COMMITTEE CHAIR
Patti Craddock
Short Elliott Hendrickson, Inc.
651-490-2067
pcraddock@sehinc.com

LABORATORY COMMITTEE CHAIR
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BIOSOLIDS COMMITTEE CHAIR
John Graupman, PE
Bolton & Menk, Inc.
507-625-4171
johngr@bolton-menk.com

YP COMMITTEE CHAIR
Rachel Kranz
Foth
651-288-8602
Rachel.Kranz@foth.com

YP COMMITTEE VICE CHAIR
Steven Norton
AE2S
763-463-5036
stephen.nhorton@AE2S.com

STUDENT COMMITTEE CHAIR
Dustin Maas
SEH
651-765-2981
dmaas@sehinc.com

STUDENT COMMITTEE VICE CHAIR
Pete Daniels
Wenck
763-479-4284
pdaniels@wenck.com

MWOA TRUSTEE
Rick Ashling
City of Albert Lea
507-373-9159
alwtp@smig.net

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JULY

July 25-26, 2013
CSWEA CSX'13 Committee and Section Exchange
Kalahari Resort and Convention Center, Wisconsin Dells, WI

July 25, 2013
WI Section Northwoods Collection System Seminar
Eagles Club, Marshfield, WI

AUGUST

August 14, 2013
WI Section Pre-Treatment Seminar
LaSure's Hall, Oshkosh, WI

August 15, 2013
CSWEA YP Milwaukee Brewers Outing
Miller Park, Milwaukee, WI

WI Section Pre-Treatment Seminar
Location and date to be determined

SEPTEMBER

September 10, 2013
IL Section Operations Seminar
Algonquin WWTP, Algonquin, IL

OCTOBER

October 5-9, 2013
WEFTEC'13
McCormick Place South, Chicago, IL

October 6, 2013
CSWEA-IWEA Welcome Reception
Hilton Chicago, Chicago, IL

NOVEMBER

November 12, 2013
MN Section Conference on the Environment
Univ of Minnesota-St. Paul-Continuing Ed & Conf Center;
St. Paul, MN

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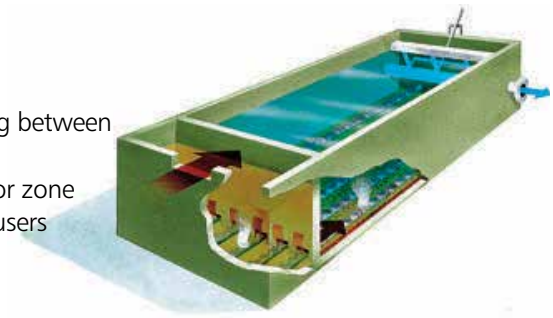

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