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

CSWEA

2011 Buyers' Guide

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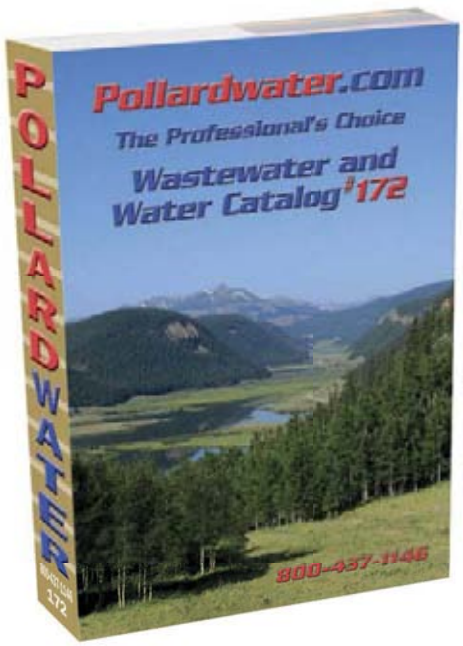

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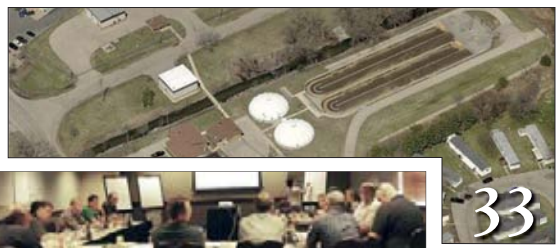

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An Active and Engaged Organization: Join the Fun

By Beth Vogt

As I write this, the days are getting shorter (which luckily helps with getting the kids to go to bed) and it seems that summer will be over soon. While the season brings images of relaxation and ease, many CSWEA members and leaders have been busy working to support our membership and industry. A number of events have occurred and additional State Section events will be held by the time you read this.

CSWEA CSX 2011 was held July 20-21, 2011 at the Kalahari Resort in the Wisconsin Dells. This annual event is an opportunity for executive committee members, State Section leadership and all committee members to exchange ideas and information on activities being held across the three states to advance our organization. A big idea from last year was the YP Leadership Academy that was implemented this April. Thanks to Rich Hussey and all of the speakers for making the inaugural event a success. This example makes it clear that getting our leadership together can result in new benefits to our membership. I am glad to report that we had great attendance at CSX 2011 and an excellent exchange. Eighteen people attended, including all three State Section Chairs. This provided a great opportunity for the State Section Chairs to spend time sharing the activities in their states and discuss ways to improve our service to each section's membership.

The progress the Minnesota Section is making on *Liquid Assets Minnesota* to educate the public, elected officials, and regulators about the importance of investing in our infrastructure was shared. The efforts of many in the MN Section, especially Andrew Sullivan, are impressive. Over $46,000 has been raised, filming is under way as I write, and airing is expected this fall. Check *www.blueprintminnesota.com* for more information.

A major topic of the exchange was discussing our annual conference and brainstorming ideas to continue to meet the needs of our membership. I would like to note that all in attendance believe that our annual conference is a great event. However, we want to stay current with membership needs to maintain the tradition that the conference is THE event to attend. Both near-term ideas for next year's conference and longer-term potential improvements were discussed. Breakout groups on conference duration/events, exhibitions, and technical program discussed current strengths and new ideas for the future. An ad-hoc committee has been formed with Patti Craddock as chair to continue to develop these ideas.

Continued on page 8

Continued from page 7

July 31- August 3, 2011 was the first WEF Energy and Water Conference in Chicago co-sponsored by CSWEA, IWEA and many other organizations. The conference was very interesting with many new technologies and ways to more effectively use our water resources and energy presented. Thanks to the many CSWEA YPs who served as moderators at the conference. As noted by the opening keynote speaker, the demands for water, wastewater treatment, and energy will continue to grow tremendously throughout the world over the upcoming decades and all of you are at the forefront in meeting these needs while providing reliable protection of the environment. I think this was a successful conference that will continue to grow.

WEFTEC will feature a CSWEA Executive Meeting and the joint CSWEA-IWEA Reception on Sunday, October 16. Special thanks for Jim Huchel and our sponsors for making the joint reception one of the best networking opportunities at WEFTEC. I hope I will have gotten to talk with many of you there to gain your insights on how we can continue to improve and serve the membership and industry.

On a personal note, I have joined the Fox River Water Reclamation District (FRWRD). My current contact information is published on page 4.

There are many activities coming up and much that has occurred since my first message. If you aren't actively involved in CSWEA, I hope this summary demonstrates that many excellent opportunities exist to get active; you will be serving with some exceptional people, and your input can help to continue shaping our organization. Have a great fall, and feel free to contact me, or any of the CSWEA leadership with your ideas and interests. CS

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Valuing Operators

Eric R. Lecuyer

There is a complaint we leaders of CSWEA often hear: we do nothing for operators. We do nothing for facility operators, and we do even less for collection system operators. This theme is repeated at WEF as well. Whether true or not, perception is reality, and if the perception is that we do too little for our operator members, the perception must be changed.

While I could spend my time here touting the many seminars, workshops and training events that CSWEA and its sections provide each year on facility operations, collection system operations, biosolids, lab workshops, pretreatment seminars, and safety and maintenance seminars, the perception would persist. Or at least the complaints would persist. This perception, that CSWEA is an organization just for the suits, engineers and managers, and not for the folks who work in jeans and t-shirts is a problem because some of our best events involve everyone: facility managers, engineers, operators, and lab personnel.

This occurred to me as I was assembling the content for this issue of *Central States Water*, only weeks after a group of highly dedicated CSWEA leaders spent many hours brainstorming ideas on how to better serve all sectors of our membership at CSX'11. And this was only a couple of weeks after I had the good fortune of participating in WEF's Operator Certification and Training Summit, where a very diverse group of MA leaders from the US and Canada spent many hours working on a plan to elevate the status of professional operators. The idea is to create a nationally recognized certification program and the creation of a designation similar to PE, or BCDEE, or RN following an operator's name. This designation would be on the same level as a professional engineer, or a board-certified diplomat of environmental engineering. Whatever the designation ends up being, the effort is intended to elevate society's view of professional operators to a highly respected profession. It is clear that professional operators are highly respected within the profession, and the value of an operator should never be overlooked. Many more details of WEF's Operator Certification and Training Summit are covered elsewhere in this issue of CS Water and I encourage all of you to support this initiative.

There must be a blurring of the lines between operators and the suits, as has been experienced at events like our Digester Foaming Workshop. The best part of these workshops has be the interaction between operators, engineers, lab personnel, and academics. The interchange of practical experiences, from antecedent conditions, control and mitigation techniques discussed by operators, coupled with the theoretical and technical background of our engineers and academics was outstanding. All involved were respected as professionals, all working on a real problem, with a common goal.

Finally, I was saddened to learn of the passing of Jerry Reynolds on August 15. Jerry was a long-time CSWEA member and past executive director of the Illinois Association of Water Pollution Control Operators, an operators group that I have the honor of being a past president. Jerry and I rarely saw eye to eye on most issues, but he was a great mentor to me as an executive director. He taught me the importance of being well prepared for meetings, and most importantly, running well-organized award banquets, knowing who was there to accept an award and who was not, to avoid the foolish plea from the presenter asking "Is Dave here to get his award tonight…anyone?" I'll never forget a discussion (argument) I lost with Jerry. We were *discussing* attracting more operators to our annual operators conference. His winning point was, "Some guys will find any excuse they can to skip the conference…some guys will find any way they can to get here. We need to focus on those guys that want to be here!" CS

> "It is clear that professional operators are highly respected within the profession, and the value of an operator should never be overlooked."

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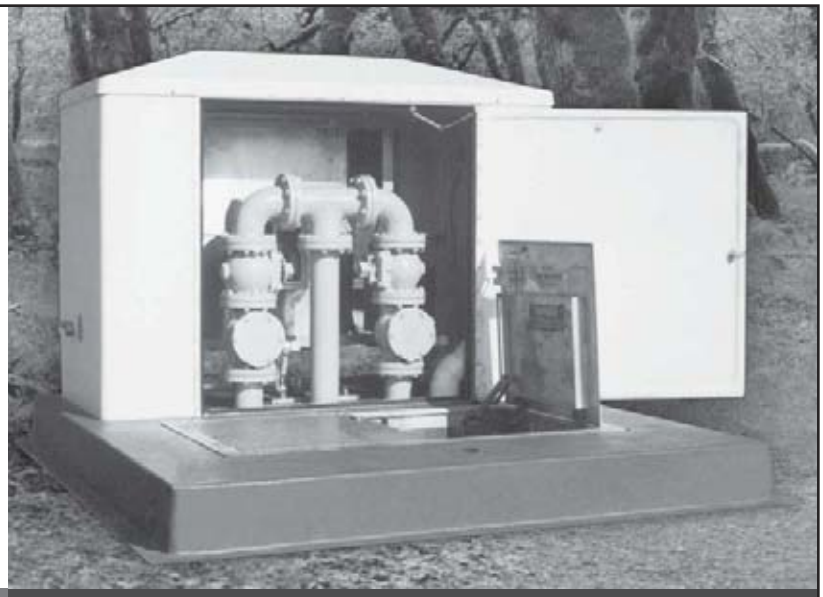

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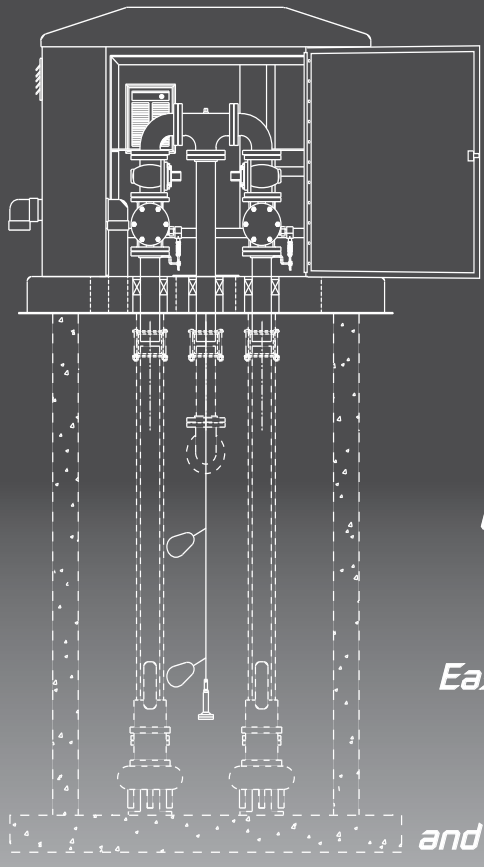

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CSWEA/IWEA to Host 16th Annual WEFTEC Welcome Reception at WEFTEC'11

CSWEA and IWEA members are invited to join us for our 16th Annual WEFTEC Welcome Reception, Sunday, October 16, 2011. The reception will be held from 6:00 p.m. to 8:00 p.m. at the WEFTEC Headquarters Hotel, JW Marriott at L.A. Live. This event has become the not-to-be-missed kick-off to WEFTEC and provides an excellent opportunity to meet up with friends and make plans for the week. Our joint Welcome Reception continues to be a wonderful success thanks to the support of our many sponsors. Oops…forgot to become a sponsor? No problem; you can easily register your firm's sponsorship by visiting *www.CSWEA.org*. See you all there!

BY JEFF MAYOU, PWO – CSWEA

Operations Challenge 2011

PUMPERS: Jeff Mayou, Rob Barnard, Todd Carlson, Matt Schmidt and Brian Skaife

SHOVELERS: Jim Miller, Jim Huchel, Jason Treat, Tom Dickson and Darsey Thoen

As two teams of four and two coaches listened to instructions and expectations, I'm excited to announce that the CSWEA Operations Challenge team members have had their first hands-on training for the upcoming WEFTEC competition that will be held in Los Angeles this October. Training was held at the Madison Metropolitan Sanitary district Nine Springs Wastewater Treatment Plant. Team events consist of collection systems, process control, maintenance, safety, and laboratory. With limited time and resources, the teams take an aggressive approach at brainstorming, assigning duties, and either simulating the events or performing tasks that are undersized in comparison to the colossal WEFTEC Ops Challenge.

Team member selections occurred prior to the CSWEA Annual Meeting and were announced during the luncheon. Protocol was followed by contacting the winners of the Operations and Collection System Awards, giving them the opportunity to participate in this year's WEFTEC Ops Challenge. Second, the 2010 CSWEA Ops Challenge team members were contacted for the option to return followed by selection of State Section Ops Challenge first-place team members. Continuity for each year is complex, and selecting team members from the amount of qualified personnel is difficult, but when all was said and done, two teams were assembled.

The returning team members anticipate another exciting year while new members await their first WEFTEC competition with enthusiasm. The Pumpers and Shovelers would like to thank CSWEA, the sponsors, support staff, and their employers, who helped make this opportunity possible. Please join the teams in Los Angeles to cheer them on and give support while they are competing.

The Pumpers team is coached by Rick Ashling, and led by team captain, Rob Barnard from Moline, IL; and team members Brian Skaife from Janesville, WI; Matt Schmidt from Green Bay, WI; and Todd Carlson from Duluth, MN.

The Shovelers are coached by Jim Miller, and led by team captain Jim Huchel, Crystal Lake, IL; and team members Darsey Thoen, from Moorhead, MN; Jason Treat from Antioch, IL; and Tom Dickson from Oconomowoc, WI.

A special thank-you goes out to the Madison MSD staff including Paul Nehm and Rhonda Rieder for accommodating our teams and allowing the use of their facilities. I'd also like to thank Montgomery Baker for the extensive laboratory training he provided.

If you would like to become a sponsor of our teams, please contact Jeff Mayou at 715-732-5184 or email *jmayou@marinette.wi.us* for more information. CS

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WEF's Operator Certification and Training Summit

CSWEA Members David Flowers and Eric Lecuyer attended WEF's Operator Certification and Training Summit in Alexandria Virginia in June. The event was well attended by a broad spectrum of WEF members and leaders from member associations throughout the US and Canada. This diverse group worked hard to provide direction to WEF on better recognizing Operators through certification and professional designation. Below is a brief summary, prepared by WEF's leader of the summit, Christine Radke, Manager Water Science & Engineering Center.

I am pleased to send to you the summary of the WEF Operator Certification & Training Summit discussions last month. We had a productive one-and-a-half day meeting, with 40 participants representing 20 WEF Member Associations (from New England to Hawaii), U.S. EPA, the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), the Association of Boards of Certification (ABC), and the National Rural Water Association (NRWA). First agreeing that the focus was on municipal (domestic) wastewater operators, participants concurred on the following key aspects:

- **Vision for the Operator Profession:** Motivated, enabled professionals with status, respect, and qualifications (knowledge, skills, and abilities) commensurate with the critical role played in the community.

- **Mission in Support of the Vision:** Establish operators as a recognized and admired (respected) profession; and ensure operator certification programs are sustainable and enable the desired level of professional recognition.

As a result, our focus will be on supporting:

- Establishment of a clear message that certification at the state level is a necessary requirement (this involves creating a firm, focused message about the importance of maintaining a wastewater operator certification program and the profession as a whole, as well as advocating for instituting guidelines similar to the *Safe Drinking Water Act* for water treatment operators into the *Clean Water Act*).
- Definition of the fundamental (minimum) body of knowledge to clearly communicate to communities the operator qualifications needed to support wastewater treatment operations, as well as establish the clear entry point to the profession (i.e., operator-in-training or operator apprenticeship program).
- Development of the concept of the high-level designation/title as a means to enhance recognition of the profession and send a strong message to communities of the significant role senior operators play in protecting public health, ensuring water quality, and enhancing overall quality of life in their communities.

These align with WEF's latest position statement on Wastewater System Operation Professionals Certification and Training. In order to be successful, WEF will seek to collaborate with member associations and other organizations as we move forward with a clear action plan. A first order of business will be to collect more detailed information on state/province operator certification requirements (i.e., What constitutes a Class I vs. Class IV operator? Is it based on the size and functions of the plant the operator will work or is it based on basic math and science skills?). This will help begin developing the bookends (entry-level to high-level operator) of a wastewater treatment operator professional career path.

For all materials shared for the summit (presentations, background information), visit *www.wefnet.org/OpsSummit*. The full summit summary and post-summit webinar presentation can also be found there. We will continue to update those interested in the progress of WEF's Operator Initiative via *www.wef.org/OperationsResources* as well as through WEF's Highlights and WaterLog. CS

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SAVE THE DATE

Central States Water Environment Association

85th Annual Conference

MAY 14-17, 2012

Pheasant Run Resort and Convention Center, St. Charles, IL

Planning for the 85th Annual Meeting is well under way, with Local Arrangements Committee Chair Gary Scott assembling an excellent committee. Plan to arrive on Monday, May 14 for an afternoon of golf on the Pheasant Run golf course, and to catch up with friends and associates at the Meet and Greet.

Tuesday, May 15 will kick off with our General Opening Session and the first full day of the Annual Meeting is packed with activities including the keynote address, three parallel tracks of technical sessions, a full day of exhibits, and winding up with an evening social event.

Wednesday, May 16 opens with the State Section breakfasts and another full slate of technical sessions, plus exhibits will again be open in the morning. The Association Luncheon will feature good food and recognition of our members. Wind up the day at the Annual Awards Banquet, and the LAC is planning some unique and fun post-banquet entertainment.

Thursday May 17 we say goodbye to another conference with the Farewell Breakfast.

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CALL *for* ABSTRACTS

85th Annual Meeting

This is a request for abstracts of papers to be considered for presentation at the 85th Annual Meeting of the Central States Water Environment Association, Inc., which will be held May 14-17, 2012 at the Pheasant Run Resort, St. Charles, IL. To receive consideration, abstracts with the Abstract Information Sheet must be submitted to the Technical Program Committee **before December 12, 2011.**

As a part of the technical program in 2012, as in past years, we hope to offer concurrent sessions of papers dedicated to specific topics associated with wastewater collection and treatment. Topics of special interest for the 2012 technical program include:

Collection systems:

- CMOM program development and implementation
- Collection system design and operation
- Green infrastructure – examples in practice
- Infiltration/inflow management
- Stormwater and combined sewer overflow management

Operations and maintenance:

- Automation/instrumentation and control/information management
- Energy conservation, production and utilization
- Membranes, biofilm treatment and related options
- Nutrients
- Process control, optimization and start-up issues

Research and design:

- New/innovative technology research and application
- Sustainability in design and construction
- Toxics/emerging pollutants monitoring and control
- Treatment design
- Wastewater reuse, applications, technology and regulatory issues

Residuals, solids, and biosolids:

- Environmental management systems
- Standard or advanced treatment and stabilization

Watersheds:

- Antidegradation issues
- Habitat or groundwater protection or restoration
- Non-point pollution sources and management
- Water quality/watershed management issues and initiatives

General:

- Laboratory issues
- Management, employment, succession, and financial issues
- Pretreatment, industrial treatment, and pollution prevention
- Regulatory issues
- Security issues

The Technical Program Committee is particularly interested in operations-oriented papers and case studies of completed projects. Papers on other subjects which may be of interest to members are, of course, also welcome. All written papers submitted are eligible for the Radebaugh Award.

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

RICK MANNER
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Instructions for the submission of abstracts and criteria for paper selection 2012 annual meeting

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

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

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

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

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

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

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

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

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

ABSTRACT INFORMATION SHEET

Paper title: _____

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

_____

_____

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

If yes, where? _____

An electronic copy of the abstract should be forwarded to:

Rick Manner - Chair, Technical Program Committee

Urbana and Champaign Sanitary District, P. O. Box 669, Urbana IL 61803

Telephone: 217-367-3409 Ext. 230 | Fax: 217-367-2603 | E-mail: *rfmanner@u-csd.com*

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

* 5 = Excellent, 4 = Good, 3 = Average, 2 = Fair, 1 = Poor

Please note abstracts are due before December 12, 2011.



CSX 2011 Wrap-up

CSX'11 was held at the Kalahari Resort, Wisconsin Dells on July 20-21, 2011 with a great group of CSWEA leaders representing all three sections. The event began with a review of past CSX Big Ideas and the successful implementation of those events, which included the first YP Leadership Academy, held in conjunction with the Annual Education Seminar in April. The meeting was well attended and the speakers were great. Rich Hussey deserves a lot of credit for organizing the event, and it appears that this could be an annual event moving forward. Also, the MWIE partnership with WWA has been strengthened through the development of a better, clearer, MOU. The 2011 MWIE event was the most successful event in its history.

Big Ideas from CSX'11 included: The potential to hold fixed teleconference between section committees and the CSWEA executive committee. This could be an annual initiative to better coordinate and encourage awards nominations. This initiative will start with the membership committee conference call between the three sections, and grow from the success of that initiative.

Much of the discussion at CSX'11 involved re-tooling of the CSWEA Annual Meeting. While the CSWEA Annual Meeting is very good and highly successful, we are trying to improve attendance at the annual conference. Some of the goals or objectives include:

a. Meet current member needs and travel limitations.
b. Attract more attendance (butts in seats/faces in front of vendor booths).
c. Enhance the technical program.
d. Partner with other organizations – win/win.

Breakout sessions were held to discuss potential changes to the annual conference:

a. Technical program.
b. Conference duration/shuffling the events.
c. Exhibition changes and enhancements.

Additional topics that could be included as part of the overall conference change discussion:

d. Developing an LAC guidance document.
e. Venue requirements.

Some of the ideas generated from the breakout sessions are recorded below:

Technical program

- Effective for engineers and managers – very technical.
- Promote attendance by operations groups – WWOA, Fox Valley Operators, MWOA, etc.
- Technical program focus may be too broad and too technical.
- Poor attendance in late afternoon sessions; need to be strategic regarding the afternoon session topics.
- Ideas:
  - Consider additional morning tracks and fewer afternoon tracks.
  - Include "Operations" track: solicit presentations, round-table discussions, invited speakers.
  - Send requests for abstracts to operations groups.
  - Leverage resources of WEF/WERF for nationally recognized speakers on regulations, research, etc.
  - Include 1-2 sentence summary of the talk and e-blast these prior to the conference.
  - Have presentations submitted prior to the conference (4 weeks).
  - Include computer station at Meet & Greet to update presentations.
  - Include focus on stormwater and watershed management issues.
  - Focus on state-specific grants and funding.
  - Broaden committee to add operations and management members.
  - Better topic grouping and solicit in specific areas.
- Action items:
  - Get input from membership on categories/topics.
  - Work with Technical Program Committee on specific idea listed above.
  - Explore ability to add additional morning tracks.
  - Add additional committee members – operations and management.

An ad hoc committee was formed to develop recommendations for future annual conferences. The intent is to potentially implement some changes at the 2013 conference in Wisconsin, and more changes at the 2014 conference in Minnesota. It is likely too late for any significant changes for the 2012 conference in Illinois. The ad hoc committee members are Patti Craddock (chair), Beth Vogt, Randy Wirtz, Rusty Schroedel, and Dean Wiebenga. Should you be interested in joining this committee, please contact Patti Craddock at *pcraddock@sehinc.com*. CS

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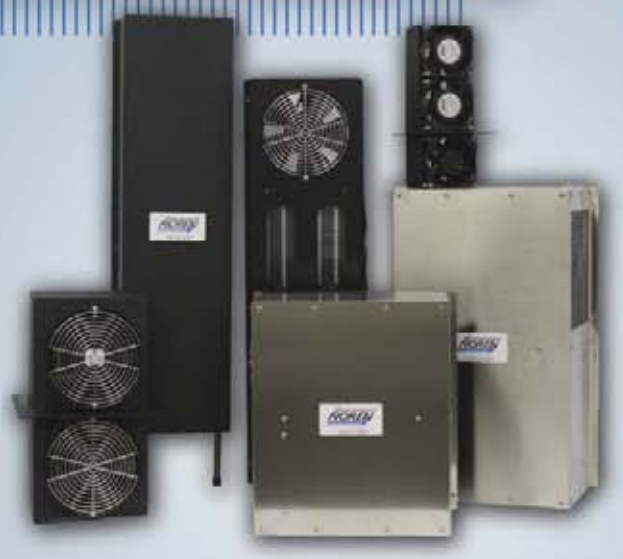

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THE 7th ANNUAL MIDWEST WATER INDUSTRY EXPO

KALAHARI RESORT & CONVENTION CENTER
WISCONSIN DELLS, WI · FEBRUARY 7-8, 2012

The 7th expo will be on Tuesday and Wednesday February 7- 8, 2012 at the Kalahari.

The expo is everybody's favorite mid-winter getaway. Our past expos were great and we have even more fun events and good sharing of information planned for 2012. If you've never attended the expo or haven't attended recently, come see what you've been missing: great exhibitors, cost effective CEUs and great fun!

The expo has been enjoyed by the attendees and exhibitors. Both groups found it to be a productive and valuable use of their time. Everyone leaves looking forward to next year. Over the years, a lot of people have brought their families so they can give them a little break from winter at the Kalahari's Water Park. You get a room with up to four water park passes for only $99.

The expo provides exhibitors the opportunity to present their goods and services to their customers and potential customers early in the year when purchases are being considered and to provide the opportunity for open dialogue with the vendors for awareness of upcoming projects and Utility needs. The Midwest Water Industry Expo accomplishes that goal.

MWIE is enjoyed by vendors and attendees alike; here's a rundown on what you can expect at MWIE 2012:

- The fundraising raffle will raise over $1,500 for Water For People and Wisconsin Water for the World. Over $2,500 in prizes including a flat screen television, and many other exciting prizes will be raffled. Over the years, the raffle has given away $25,000.
- More than 400 individuals, not counting exhibitors, attended the expo each year.
- Visit nearly one hundred exhibitors providing a wide range of products and services.
- 32 half-hour vendor presentations where vendors talk specifically about a product or service they represent in classroom sessions.
- Many 10-minute booth talks throughout the two days. Look for the "blue light special."
- Four CEUs per day, up to a total of eight for water or wastewater.
- Continental breakfast and lunch provided both days.
- Meet and greet from 3:00 to 5:00 on Tuesday, February 7.

Planning is already under way for the expo, but it's not too late to get involved. If you would like to help on the expo committee, send an email to Eric Lecuyer at *cswea@ymail.com* or talk to anyone on the committee. CS

BY RANDY WIRTZ & PATTI CRADDOCK

Submit for an Award

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

A top priority of CSWEA each year is to recognize the efforts of our members and water and wastewater professionals at all levels. We also seek to provide top-quality nominees to the Water Environment Federation (WEF) each year for national level recognition. Sadly, many awards have few or no nominations each year, resulting in missed opportunities to provide recognition to deserving water quality professionals. It's time to brag a little bit about the accomplishments of our members.

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

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

Please note that award submittals need to be made by December 1, 2011 to allow distribution to the respective CSWEA or WEF Awards Committees for consideration. CSWEA will present the winners with their awards at the 85th Annual Meeting Awards Banquet in May 2012. WEF awards will be presented at WEFTEC 2012 in New Orleans.

2011 CSWEA & WEF AWARD NOMINATIONS NOW BEING ACCEPTED

Nominations are now being accepted for the following WEF awards, and should you be aware of a worthy nominee, we ask that you please complete and return the bottom portion of page 30 for consideration. Note that it is OK to self nominate. Each award is briefly described below and complete information may be found on the *www.CSWEA.org* or *www.WEF.org* websites.

Charles Alvin Emerson Medal:

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

Harry E. Schlenz Medal:

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

Richard S. Englebrecht International Activities Service Award:

This award is presented by WEF and recognizes sustained and significant contributions to the furtherance and improvement of the activities of the Water Environment Federation in the international field.

Outstanding Achievement in Water Quality Improvement Award:

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

Gordon Maskew Fair Medal:

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

Public Education Awards:

There are three categories of Public Education Awards: ***Individual, Member Association*** and ***Other***. The awards are presented by WEF and recognize significant accomplishments in promoting awareness

and understanding of water environment issues among the general public, through the development and implementation of public education programs.

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

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

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

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

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

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

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

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

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

Academic Excellence Award:
The Academic Excellence Award is given to one student per year from each eligible

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

Collection System Award:

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

George W. Burke Safety Award:

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

Central State Section Safety Award:

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

Industrial Environmental Achievement Award:

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

Lab Analyst Excellence Award:

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

Industrial Environmental Achievement Award:

The award is given to one industry per year at the CSWEA Annual Meeting in recognition of outstanding contributions in waste minimization, pollution prevention, environmental compliance and environmental stewardship.

Bill Boyle Educator of the Year Award:

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

CSWEA Outstanding Young Professional Award:

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

Additional information on these awards is located at *www.CSWEA.org*, *www.WEF.org*, or by contacting Eric Lecuyer, 815-954-2714, *cswea@ymail.com*.

To submit nominations for any award, please complete and submit the following information to Randy Wirtz by e-mail, fax, or regular mail to:

to: RANDY WIRTZ
Strand Associates, Inc.
910 W. Wingra Drive, Madison, WI 53715
Phone: 608/251-2129 x 1102 Fax: 608/251-8655 E-mail: randy.wirtz@strand.com

Nominations must be received no later than December 1, 2011 for consideration.

Award name:_____ Nominee:_____

Nominee contact information (include as much info as possible):

Employer name:_____

Phone #:_____ Email address:_____

WEF member ID:_____ Other:_____

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

_____

_____

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

Your contact information:

Phone #:_____ Email address:_____

Other:_____

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26th Annual Conference on the Environment

Air & Waste Management Association
Upper Midwest Section

Wednesday, November 9, 2011 | Earle Brown Heritage Center
6155 Earle Brown Drive, Brooklyn Center, MN 55430 | *www.earlebrown.com*

Be sure to mark your calendars (this year the conference is on a Wednesday) and register for the upcoming 26th Annual Conference on the Environment (COE) developed jointly by the Air & Waste Management Association (A&WMA) – Upper Midwest Section, and the CSWEA – Minnesota Section.

Mr. Paul Aasen will be the morning keynote speaker and will kick off the COE conference with an update on the direction and mission of the Minnesota Pollution Control Agency (MPCA) in a time of regulatory change and tough economy.

Paul Aasen was appointed Commissioner of the MPCA by Governor Mark Dayton in 2011. Prior to this, he had been with the Minnesota Center for Environmental Advocacy, serving as its advocacy director since 2007. He has also held positions as the Executive Vice President at Global Volunteers, Director of Government Relations and Policy in Gov. Jesse Ventura's office, Department of Public Safety Assistant Commissioner, Division of Emergency Management Director, Minnesota Emergency Response Commission Executive Director, and was an environmental scientist at the Metropolitan Waste Control Commission. Paul has a masters degree in environmental health from the University of Minnesota School of Public Health.

Mr. Brad Moore, Executive Vice President, Environmental and Governmental Affairs, PolyMet Mining Corp., will be the lunchtime keynote speaker. He will provide perspectives from over 25 years of experience in various prominent regulatory, industry, and public and private positions. He served as MPCA Commissioner from 2006 to 2008, was the Assistant Commissioner for Operations of the Minnesota Department of Natural Resources (MDNR) from 1999 to 2006, and prior to joining Polymet this year, was a Senior Advisor for Public and Governmental Affairs at Barr Engineering.

TED FIELD, CSWEA MN Section GREG ARCHER, A&WMA – Upper Midwest Section

COE Conference breakout sessions will cover:

- Nutrients
- Wastewater technology
- Sulfate regulation review and control technology
- Energy and resource recovery
- Air compliance and energy efficiency
- MPCA regulatory update
- Adaptive strategies to meet ambient air quality standards
- Managing the stakeholder process
- Student environmental challenge

There will also be exhibitors and graduate student posters.

The Student Environmental Challenge this year includes a problem statement that asks the students to play the role of a hypothetical utility that needs to meet a new phosphorus discharge limit and meet a goal of reducing the city's demand for potable water from the underground aquifer source by 20%. Students from universities and colleges in Minnesota and North Dakota have been invited to form teams to provide solutions in a short paper and give a presentation to compete for over $2,000 in total prize money.

Online registration is available by visiting *http://www.cswea.org/minnesota/events/*

Hotel accommodations can be made by contacting:
Embassy Suites, Minneapolis – Brooklyn Center
6300 Earle Brown Drive | Brooklyn Center, MN 55430 | 763-560-2700 | *www.embassysuites.com*

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The Flame Trap Assembly has visual indication to monitor the open or closed position of the pallet. Wiring the proximity switch to the local control room will notify personnel when the thermal valve pallet closes. The addition of the proximity switch now enables plant personnel to have real-time status to ensure gas flow is not restricted.

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L-R: Operators Bill Hutson and Larry Wollin, Superintendent Bob Scherr, Operator Ken Bosteder, Foreman Bill Kiessling, and GIS Intern Derek Furger.

City of Lake Mills
Wastewater Treatment Plant

By Kevin Hopkins, P.E., Strand Associates, Inc.

Superintendent Bob Scherr and his four operating staff at the City of Lake Mills, Wisconsin, wastewater treatment plant received the Central States Water Environment Association's Wisconsin Section Operation Award this year at the 84th Annual Meeting.

Plant background

The Lake Mills Wastewater Utility serves 8.2 square miles and approximately 5,200 residential, commercial, and industrial customers within the city limits and in the town of Lake Mills. The staff maintain 42 miles of sanitary sewer as well as 17 lift stations within the service boundary.

The treatment plant was upgraded from an RBC plant to an activated sludge oxidation ditch plant in 1991. In 2002 a new raw wastewater bar screen and wash press were installed along with chemical phosphorus removal and additional sludge storage. A 2009 upgrade included SCADA alarm, plant, and lift station monitoring.

Table 1:
Influent Flows and BOD5 Loadings

Year	Influent Flow mgd	Influent BOD_5 lbs/day
2007	1.05	1,433
2008	1.12	1,312
2009	0.94	1,415
2010	0.91	1,454

The treatment plant is designed for an average daily flow of 1.16 mgd and a maximum daily flow of 2.42 mgd. Design BOD_5, TSS, and TKN loadings are 1,856 lbs/day, 2,143 lbs/day, and 235 lbs/day, respectively. Average annual influent flows and BOD_5 loadings from 2007 through 2010 are summarized in Table 1.

Preliminary treatment and influent pumping

Raw wastewater enters the screening building where it is screened with a step screen with 1/4-inch spacing between bars. Screenings are washed and compressed and disposed of at a landfill. The original coarse mechanical screen is used as a backup screen. Flow is metered in a Parshall flume and discharges to a submersible pump station. Four submersible pumps, including one backup pump, have a firm pumping capacity of 2.9 mgd and pump the screened wastewater to the oxidation ditch splitter box.

Secondary treatment

Screened wastewater is mixed with RAS in the oxidation ditch splitter box before being split between two oxidation ditches. Each oxidation ditch has a volume of 808,000 gallons and one 50 hp variable speed aerator. Volumetric design loading to the oxidation ditches is 9 lbs BOD_5/1,000 cu ft/day for both BOD_5 removal and nitrification.

Mixed liquor flow is split at the end of the oxidation ditches where it flows to two final clarifiers. Because of the long detention time in the oxidation ditches (1.4 days at design average flow), the clarifiers are covered to minimize freezing. Each clarifier is 55 feet in diameter with a 16.5-foot side water depth. A suction header in each clarifier is piped to a telescopic valve that controls the rate of RAS withdrawal from the clarifier. RAS flow is metered before discharge to a RAS pumping station. Two dry-pit centrifugal pumps plus one backup pump RAS to the oxidation ditch splitter box.

Phosphorus removal

Total phosphorus (TP) is chemically removed by adding alum to the head or end of the oxidation ditches. Two 4,600-gallon tanks provide approximately two months of alum storage. Alum is pumped to the application point using flow-paced chemical metering pumps.

Table 2: WPDES Permit Limits

BOD5 mg/L	TSS mg/L	NH3-N mg/L	TP mg/L
10 (May - Oct)	10 (May - Oct)	1.6 - 12 (varies by month)	1
14 (Nov - Apr)	14 (Nov - Apr)		

Table 3: Effluent Quality

Year	BOD_5 mg/L	TSS mg/L	NH_3-N mg/L	TP mg/L
2007	2	2	< 0.1	0.7
2008	2	3	< 0.1	0.7
2009	3	4	< 0.1	0.7
2010	2	3	< 0.1	0.7

Disinfection and post-aeration

Secondary effluent is metered and then disinfected using gaseous chlorine. A chlorine contact tank provides sufficient detention time to meet the fecal coliform limit of 400-count/100 ml from May 1 through September 30. Gaseous sulfur dioxide is used to remove remaining chlorine residual prior to discharge. Diffused aeration and a cascading step aerator are used to provide dissolved oxygen to meet the effluent limit of 7 mg/L. Treated effluent is discharged to Rock Creek, which is a tributary to the Crawfish River.

Biosolids management

Excess biosolids generated by the treatment processes are periodically removed. The biosolids are pumped with polymer to a gravity belt thickener. The thickener provides a quiescent settling zone to separate water from the solids. The biosolids are thickened to approximately four percent total solids. Filtrate from the thickener is returned to the influent pumping station for treatment. Thickened biosolids are pumped to one of five storage tanks on site. This provides a minimum of 180 days storage. Submersible mixers in each tank mix the contents prior to removal. The city contract hauls the biosolids to local farmland for beneficial reuse. The biosolids are injected into the soil and consistently meet state and federal Class B requirements. Contract hauling occurs in the spring and fall.

Laboratory, storage, and maintenance

The plant has a fully equipped laboratory to run daily tests for monitoring influent, effluent, and process parameters. Annual metals analysis for biosolids monitoring is contracted out to a commercial laboratory. Storage buildings and parking garages on site provide facilities to maintain equipment and store utility vehicles.

Plant performance

The plant's WPDES permit limits for key effluent parameters are summarized in Table 2.

Average annual effluent parameters from 2007 through 2010 are summarized in Table 3.

The plant has consistently met WPDES permit limits for BOD_5, TSS, NH_3-N, and TP. Effluent NH_3-N concentrations are often nondetectable. Fecal coliform, chlorine residual, and dissolved oxygen concentrations are also consistently within limits. CS

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By Gary B. Scott, CPMM, Glenbard Wastewater Authority,
Illinois Section Safety Chair, WEF Safety & Occupational Health Committee Liaison

TORNADO PREPAREDNESS

Tornadoes can occur anywhere and at any time during the year, and are one of the most destructive forces of nature. In an average year, 800 tornadoes are reported nationwide, resulting in 80 deaths and over 1,500 injuries. A tornado is defined as a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction and may have wind speeds of 250 mph or more, and may last for more than an hour. Damage paths have been documented as being limited to a single home, and in excess of a mile wide and 50 miles long. The national Weather Service once documented a tornado in Broken Arrow, Oklahoma which carried a motel sign 60 miles and dropped it in Missouri.

Our typical end-of-August, beginning-of-September weather is very hot and humid in the CSWEA region, and can be a forerunner of the development of some very severe thunderstorms. Thunderstorms develop in warm, moist air in advance of eastward-moving cold fronts. These thunderstorms frequently produce large hail, damaging winds, and tornadoes. Tornadoes are often associated with strong, frontal systems that form in the Central Plains regions and move east. In these frontal systems, thunderstorms frequently develop along a dry-line, which separates very warm, moist air to the east from hot, dry air to the west. Tornado-producing thunderstorms may quickly form as the dry-line moves east.

Early warnings about a likely tornado can help save your life. Meteorologists rely on weather radar to provide information on developing storms. The National Weather Service has strategically locating Doppler radars across the country which can detect air movement toward or away from the radar. Early detection of increasing rotation aloft within a thunderstorm can allow life-saving warnings to be issued before the tornado forms. When conditions are favorable for severe weather to develop, a severe thunderstorm or tornado watch is issued. Weather Service personnel use additional information from weather radar, spotters, and other sources to issue warnings for areas where severe weather is imminent.

The National Weather Service continuously broadcasts updated weather warnings and forecasts that can be received by NOAA Weather Radios sold in many stores. The National Weather Service recommends purchasing a radio that has both a battery backup and a tone-alert feature which automatically alerts you when a watch or warning is issued. Weather warnings are passed to local radio and television stations, and are broadcast over local NOAA Weather Radio stations serving the warned areas. These warnings are also relayed to local emergency management and public safety officials who can activate local warning sirens to alert your community.

WARNING SYSTEMS:

- Severe Thunderstorm Watch: Severe thunderstorms are possible in your area.
- Severe Thunderstorm Warning: Severe thunderstorms are occurring.
- Tornado Watch: Tornadoes are likely to occur in the watch area. Be ready to act quickly and take shelter, and check supply kits. Monitor radio and television stations for more information.
- Tornado Warning: Imminent threat – a tornado has been sighted in the area or has been indicated by radar. Take shelter immediately.

Tornadoes can appear rapidly, so it is important to be familiar with the warning signs in order to be prepared. Tornadoes are most likely to occur between 3 and 9 p.m., but have been known to occur at all hours of the day or night. The average tornado moves from southwest to northeast, but tornadoes have been known to move in any direction. The average forward speed is 30 mph but may vary from nearly stationary to 70 mph. Environmental clues which suggest that a tornado is forming include:

- Dark, often greenish clouds or sky; sometimes an eerie stillness precedes tornadoes.
- Wall cloud; some tornadoes are obscured by the heavy rain.
- Large hail or signs of debris below a visible funnel.
- Visible funnel; some tornadoes appear extending only partially to the ground.

BEFORE THE STORM:

- Develop an emergency plan for you and your family for home, work, school and including seasonal drills.
- Have an NOAA Weather Radio and battery backup to receive warnings.
- Know the area in which you live, and follow storm movement from weather bulletins.
- During outdoor activities, listen to the latest forecasts and take necessary action if threatening weather develops.

IF A TORNADO WARNING IS ISSUED, OR IF THREATENING WEATHER APPROACHES:

- In your home, move to the basement, interior room or hallway on the lowest floor, or get under a sturdy piece of furniture.
- If outdoors, move to a designated safe shelter or nearby building interior room or hallway on the lowest floor, or get under a sturdy piece of furniture. Stay away from doors, windows, and outside walls.
- If driving, get out of automobile. Do not try to outrun a tornado in your car; leave it immediately and get into an area which is noticeably lower than the roadway. Lie in that area and cover your head with your hands.
- Mobile homes, even if tied down, offer little protection from tornadoes and should be abandoned immediately.
- Monitor your NOAA Weather Radio or television stations for emergency information and the potential of additional storms.

Each year, many people are killed or seriously injured by tornadoes despite advance warning. Some may not have heard the warning, while others received the warning but did not believe a tornado would actually affect them. While the NAAO reports the tornado season is March through September, tornadoes have occurred during every month of the year. Preparedness, combined with timely severe weather warnings, could save your life in the event a tornado threatens the Central States region and your family. After you have received the warning or observed threatening skies, you must make the decision to seek shelter before the storm arrives. It could be the most important decision you will ever make. CS

CSWEA Signs on to USEPA Nutrient Letter

The Central States Water Environment Association signed on to a recent letter to USEPA Administrator Lisa Jackson seeking to have EPA modify its approach to point source nutrient standards and assure that the establishment of these standards are tied to tangible, identifiable and measurable water quality improvements. Below is NACWA's letter to Administrator Jackson.

August 2, 2011

The Honorable Lisa P. Jackson
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Code: 1101A
Washington, D.C. 20460

Dear Administrator Jackson,

Nitrogen and phosphorus are unlike any pollutants previously addressed through the *Clean Water Act* (CWA). The unique properties of these nutrients and the varying responses aquatic ecosystems can exhibit when nutrient levels increase or decrease demand special consideration when crafting control approaches. The undersigned organizations and their respective members are ready to do their fair share to address nutrient-related impacts where water quality goals are attainable, measurable, and meaningful and are achieved through the most cost-effective nutrient control measures by all relevant sources, including nonpoint sources such as agriculture.

The municipal clean water community, however, continues to be the only major source of nutrients held accountable for its contributions in most parts of the country and has already invested billions of dollars of ratepayer money to address this critical water quality challenge. Given that tens of billions of dollars in additional investment may be needed nationwide to address our sector's contribution of nutrients, there must be certainty as to the corresponding water quality outcomes from these investments. Therefore, it is critical that the U.S. Environmental Protection Agency (EPA) enable the States to develop meaningful water quality goals to serve as the foundation of the CWA's total maximum daily load (TMDL) and permitting programs. This will serve to help ensure that nutrient loading reductions are both cost-effective and sustainable and the investments municipalities make have a real and significant impact on water quality while maximizing overall environmental benefit.

With this as context, we recommend that EPA accept approaches that do not fit its current mold for developing water quality criteria. EPA's continued insistence that States develop independently applied numeric criteria for both nitrogen and phosphorus for all waters is hindering progress and we urge EPA to embrace and support the many innovative approaches being employed by, and available to, States to reduce nutrient loadings.

Recently, concerns have been raised about an apparent conflict in two EPA policy statements. The first is a March 1, 2011 letter from Nancy Stoner, Acting Assistant Administrator for EPA's Office of Water, responding to a letter from the New England Interstate Water Pollution Control Commission. The second is a March 16, 2011 memorandum from Ms. Stoner to the EPA Regional Administrators. The March 1 letter was in response to correspondence regarding the Letter to Administrator Jackson on Numeric Nutrient Criteria nutrient criteria being developed by two States in the Northeast. The States' preferred methodology relies on a weight of evidence approach for determining when designated uses were not being met. The Agency's response was clear – States must adopt numeric nutrient criteria (NNC) in all water bodies for both nitrogen and phosphorus and those numeric values must be applied independent of any other information (e.g., biological indicators of water quality) to determine whether a use was being impaired. The letter was interpreted as limiting State innovation when responding to local water quality needs.

Two weeks later, however, EPA issued the March 16 memorandum which stressed that States must take the lead in addressing nutrients and that they "need room to innovate and respond to local water quality needs, so a one-size-fits-all solution to nitrogen and phosphorus pollution is neither desirable nor necessary." While the March 16 memorandum suggested additional flexibility from EPA on the development of NNC, in reality the memorandum only provided the timeframe and process in which EPA expects

all States to develop NNC for nitrogen and phosphorus for all waters. The March 16 memorandum also states that in the interim, while States work to develop these NNC, they should focus on making reductions by ensuring the "effectiveness of point source permits."

Though the March 16 memorandum contained some language that could be read as EPA being open to flexible approaches, it simply gave "interested and willing states" more time to develop independently applicable NNC for all waters. This federal model for numeric criteria development has not been working and has only resulted in further delay in implementing nutrient controls. States are exploring new approaches, including:

- Adopting criteria for response variables, such as chlorophyll *a* or dissolved oxygen, instead of numeric values for nitrogen and phosphorus.
- Developing predictive tools and models to evaluate nutrient impacts and protect unimpaired waters.
- Timing technology upgrades for nutrient control with wastewater treatment plant upgrades.
- Taking steps to control nutrients to protect downstream uses, such as monitoring to ensure uses are maintained, setting permit limits that ensure upstream discharges do not cause exceedances of downstream criteria, and applying antidegradation rules at upstream sites.
- Using other indicators of adverse water quality impacts in a waterbody to direct reduction activities.
- Exploring the use of water quality trading to achieve nutrient reductions.
- Prioritizing to make targeted reductions to address key watersheds first using existing narrative standards.

EPA must embrace and support these types of approaches and ensure that other States have the flexibility to undertake similar efforts.

States must be able to look beyond simple numeric values for nitrogen and phosphorus and use different approaches and strategies as needed to address the unique needs of a particular watershed. Where numeric values that lack a meaningful link to water quality are simply imposed, as with the federal nitrogen and phosphorus criteria developed by EPA for Florida's rivers and streams, there are significant concerns that implementation will be costly and ineffective in protecting the environment. Efforts in the Chesapeake Bay have demonstrated that NNC for response variables, instead of nitrogen and phosphorus, can still enable TMDL development and CWA permitting. Criteria development efforts in Ohio are demonstrating that a weight of evidence approach, using biology in addition to concentrations of nitrogen and phosphorus, can be used not only to evaluate impairment, but to predict adverse water quality impacts and prevent impairments in waters that are currently healthy. In Kansas, real progress is being made in addressing nutrient-related water quality impacts even though the State has not developed any numeric nutrient criteria. At the same time as supporting these different State efforts, EPA must use the full suite of CWA tools currently available, including adaptive management and variances like the approach being explored by Montana, to ensure criteria implementation is as flexible as possible. Where NNC are developed, they must:

- Be technically and scientifically defensible, and adequately reflect the full range of biological, chemical, and physical properties of the waterway, ultimately protecting the designated use.
- Be based on a demonstrated and quantified cause and effect relationship and appropriately qualified by the uncertainty in that relationship.
- Not be used as the basis for imposing nutrient controls unless the weight of the evidence indicates that impacts have resulted, or will result, from excess nutrients.

Reliance on criteria development and permit implementation approaches that are poorly linked to the ecological effects of nutrient pollution will result in major expenditures for point sources with possibly no or minimal improvement to water quality for many waters and potentially having a greater overall environmental impact (e.g., greenhouse gas release, raw material consumption, etc.). This is especially true in the majority of watersheds nationwide where point sources are

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not the predominant source of nutrient loadings. At the same time, placing an emphasis on reducing nutrient loadings ahead of criteria development, as encouraged in the arch 16 memorandum, will similarly result in a waste of resources if there is a lack of connection to the specific ecological needs of a waterbody. Reducing nutrient loadings cannot be presumed to yield positive outcomes in all cases and efforts to address impacts must be prioritized based on an understanding of the underlying biological conditions.

Ultimately, for real progress to be made on this critical issue, more comprehensive change is needed to ensure all sources of nutrients are equitably incorporated into any viable solution and held accountable for their fair share. Too often point sources, even in cases where they represent a fraction of the total load, are being required to achieve reductions at the limits of technology simply because they are deemed by EPA to be the only controllable source under the CWA. Recent examples in New Hampshire and Colorado underscore this inequity in nutrient control implementation.

Again, the undersigned organizations urge EPA to focus on water quality, not process, and embrace and support the many innovative approaches being employed by States to reduce nutrient loadings.

Signed

National Association of Clean Water Agencies
Water Environment Federation
Association of Environmental Authorities of New Jersey
Association of Ohio Metropolitan Wastewater Agencies
Bay Area Clean Water Agencies
California Association Sanitation Agencies
Central States Water Environment Association
Colorado Nutrient Coalition
Colorado Stormwater Council
Colorado Wastewater Utility Council
Georgia Association of Water Professionals
Florida Water Environment Association Utility Council
Illinois Association of Wastewater Agencies
Kansas Water Environment Association
Lower Neuse Basin Association
Maryland Association of Municipal Wastewater Agencies
Massachusetts Coalition for Water Resources Stewardship
Massachusetts Water Pollution Control Association
Missouri Water Environment Association
New England Water Environment Association
Neuse River Compliance Association
New York Water Environment Association
Oregon Association of Clean Water Agencies
Rocky Mountain Water Environment Association
South Carolina Water Quality Association
Southern California Alliance of Publicly Owned Treatment Works
Texas Association of Clean Water Agencies
Virginia Association of Municipal Wastewater Agencies
Water Environment Association of Texas
Western Coalition of Arid States

cc: Nancy Stoner, Acting Assistant Administrator, Office of Water, U.S. EPA CS

Are Your Engines Affected by the RICE MACT?

By Megan Corrado

The USEPA has gradually expanded the scope of an air quality regulation aimed at reducing hazardous air pollutants (HAPs) from reciprocating internal combustion engines (RICE). HAPs form during the combustion process and include organic compounds such as formaldehyde or acetaldehyde. The more inefficient an engine is, the more HAPs that are produced. Inefficient engines also emit more carbon monoxide (CO), so the rule uses CO as a surrogate for inorganic HAP emissions. Another group of HAPs that form during combustion are metallic HAPs such as chromium or lead compounds. Metallic HAPs are tied to the quality of fuel being used.

The RICE MACT (a nickname) defines the maximum achievable control technology (MACT) for engines with the goal of reducing HAP emissions. You may also see the rule referred to as 40 CFR Part 63 Subpart ZZZZ, which gives the location of the rule within the Code of Federal Regulations. Control technologies vary from improved maintenance procedures to the installation of end-of-stack emission control equipment. Better maintenance leads to more efficient engines and thus, lower HAP emissions. Sometimes maintenance is not enough, and catalytic oxidizers are used to capture the HAPs from the engine exhaust before it is emitted.

First enacted in 2004, the RICE MACT targeted big engines at big facilities (major sources). Fast forward to 2010 and the rule now includes small engines at small facilities (area sources). It now impacts many operations that have never had to deal with air quality regulations before. Newly regulated entities include wastewater utilities that have backup engines to keep their pumps on during power outages.

This rule is complicated, long, and refers to three other rules. It now has over 70 different applicability combinations, which depend on multiple variables. The first variable is whether or not you already emit a lot (> 10 tons per year of a single HAP or > 25 tons per year cumulative HAPs) of HAPs. Wastewater utilities, most likely, do not emit a lot of HAPs, and so you can ignore anything that applies to a "major" source of HAPs and focus on sections of the rule that refer to "area" sources. After that, the rule breaks the engines down into "emergency" and "non-emergency" engines.

EMERGENCY ENGINES

If you only operate your engine during power outages or for readiness testing and maintenance, then your engine meets the definition of an Emergency Stationary RICE. However, it is very important to note that if you have an interruptible rate agreement with your utility where the utility may call on you from time to time to run your engines to help them out, you do NOT have an emergency engine. The rule treats non-emergency engines differently, as you'll see below.

When it comes to the RICE MACT, age matters. If your engine is less than five years old, then the RICE MACT tells you to comply with either the new source performance standards (NSPS) for compression ignition (CI) engines (40 CFR Part 60 Subpart IIII) or the NSPS for spark ignition (SI) engines (40 CFR Part 60 Subpart JJJJ). The easiest way to comply with these rules is to own a "Tier 2 certified" engine. Tier 2 refers to a set of emission standards that the manufacturer designs into the engine. So, for a new emergency engine, you need to document that you have a Tier 2 certified engine, and the RICE MACT is covered.

If your emergency engine is more than five years old, then you have until mid-2013 (May 3 for diesel engines, October 13 for gas engines) to implement prescribed maintenance practices. These include oil and filter changes, and inspections of the air cleaner, hoses, and belts at predetermined frequencies. Maintenance logs are also required to document compliance with the rule.

Finally, all emergency engines are required to install non-resettable hour meters to document that they really only run during emergencies. An operations log showing the reason for running the engine must also be kept. All in all, the requirements for emergency engines are not so bad. You don't even need to submit paperwork to the USEPA. You just keep your records on file.

NON-EMERGENCY ENGINES

Similar to new emergency engines, new non-emergency engines that meet the NSPS requirements (i.e., are Tier 2 certified engines), comply with the RICE MACT. If your engine is more than five years old, then your engine may need to be equipped with some emission control equipment, likely a catalytic oxidizer. In order to know for sure, you need to know what type of engine you have and its size. Diesel-fired engines are compression ignition (CI) engines. Gas-fired engines (natural gas, gasoline, propane, or biogas) are spark ignition (SI) engines. SI engines are further defined as two-stroke or four-stroke and lean-burn or rich-burn engines. Horsepower (HP) is used to categorize engine size.

See the table below for a basic description of what is required for non-emergency diesel (CI) engines. Smaller engines can control HAPs through routine maintenance, but larger engines are required to install add-on emission controls. The RICE MACT recognizes that the most likely add-on control technique is oxidation catalyst, (i.e., a catalytic converter for the engine's stack). In addition, large diesel engines emit more of the metallic HAPs, so fuel quality is regulated and emissions from the crankcase of the engine also need to be controlled.

If you have an SI engine that burns digester or biogas, then only the maintenance requirements in the RICE MACT apply. (Note: If you combust biogas, we recommend checking with a local expert to see if additional state regulations apply.) See the table below for a basic description of what is required for all other non-emergency gas-fired SI engines. Two-stroke engines and small four-stroke

Non-Emergency Gas-Fired Spark Ignition (SI) Engines

Stroke	Lean or Rich Burn	Size	Non-Emergency Gas-Fired Engine (SI) RICE MACT Requirements
2-Stroke	Lean Burn	Any	Maintenance Requirements ONLY
4-Stroke	Lean Burn	Less than or equal to 500 HP	Maintenance Requirements ONLY
4-Stroke	Lean Burn	More than 500 HP	Emission Controls: Limit CO emissions to no more than 47 ppm_{vd} or reduce CO emission by 93 percent or more.
4-Stroke	Rich Burn	Less than or equal to 500 HP	Maintenance Requirements ONLY
4-Stroke	Rich Burn	More than 500 HP	Emission Controls: Limit formaldehyde emissions to no more than 2.7 ppm_{vd} or reduce formaldehyde emission by 76 percent or more.

Non-Emergency Diesel-Fired Compression Ignition (CI) Engines

Size	Non-Emergency Diesel Engine (CI) RICE MACT Requirements
Less than or equal to 300 HP	Maintenance Requirements ONLY
Between 300 and 500 HP	Emission Controls: Through the use of catalyst, limit CO emissions to no more than 49 parts per million by volume, dry basis (ppm_{vd}) or reduce CO emission by 70 percent or more. Fuel quality standards kick in. Use a closed crankcase ventilation system or an open crankcase filtration system.
More than 500 HP	Emission Controls: Through the use of catalyst, limit CO emissions to no more than 23 ppm_{vd} or reduce CO emission by 70 percent or more. Fuel quality standards kick in. Use a closed crankcase ventilation system or an open crankcase filtration system.

engines can control HAPs through routine maintenance, but larger four-stroke engines are required to install catalysts.

OTHER REQUIREMENTS FOR ENGINES NEEDING EMISSIONS CONTROLS

Engines that fall into an "emission control" category will need to have their emissions tested after the controls are installed, and periodically thereafter, to demonstrate that the desired level of emission control is taking place. In between tests, you will be required to continuously monitor the pressure drop across the catalyst and the engine exhaust temperature to ensure that the catalyst is working properly.

There is more paperwork in store for engines that require emission controls, too. You are required to file an Initial Notification, Notification of Compliance Status, and a Notification of Intent to Source Test with your state agency. You are also required to submit semiannual monitoring summary reports and an annual certification of compliance.

PLANNING AHEAD

New engines are the least likely to be impacted by RICE MACT. Emergency engines of any size, engines that burn digester gas, and small non-emergency engines will probably require a little more maintenance and paperwork. Large, non-emergency engines are required to have emission controls. You may be tempted to terminate your interruptible rate agreement in order to avoid operating "non-emergency" engines. However, the cost of add-on emission controls is often paid back within two years when you factor in interruptible rate agreement savings.

Now is a great time to take a closer look at how your engines will be regulated in 2013. Plan ahead and include the cost of additional maintenance or add-on emission controls into your facility's 2012 budget. While the RICE MACT is a federal rule, each state has its own rules too. If you haven't done so already, this may be a good time to look at air compliance issues in general, such as permitting requirements, emissions inventory reporting, or visible emission standards. CS

LOCAL ASSOCIATION ASSISTS OPERATORS ASSESS DIGESTER FOAMING –

Survey and Workshop Results in Solutions

By Ralph B. "Rusty" Schroedel, Jr., P.E., BCEE, AECOM, Jeff Brochtrup, P.E., Madison (WI) Metropolitan Sewerage District, Randall A. Wirtz, Ph.D., P.E., Strand Associates, Inc. and Eric Lecuyer, CSWEA

Abstract

The Central States Water Environment Association, in response to member interest, formed an Ad Hoc Committee to help assess the occurrence, causes, and solutions to anaerobic digester foaming. Through an online survey and workshops, it was determined that foaming was relatively common, could have a variety of causes, may have a variety of solutions, and was worth further investigation.

Key Words

Digester foaming, anaerobic digestion, digestion survey

Introduction

The Central States Water Environment Association (CSWEA) is actively engaging treatment plant operators. At the May 2009 Annual Meeting, several attendees identified the operating challenge of dealing with anaerobic digester foam. Agreement was reached that the association should arrange some kind of workshop to help the members address this complex challenge.

CSWEA has been working to identify a way to better engage treatment plant operators. Not only are they the most knowledgeable on how the facilities actually operate, but our board has noted that they are the leaders of the future. To assure a stable or growing organization that serves all of its members, we continually try to have programs that will encourage operator participation and interest in Central States.

Based on the identification of interest in the topic of anaerobic digester foaming, then association president Rusty Schroedel named an Ad Hoc Committee with the intent to determine if digester foaming was a common problem, to engage operators in some way to try to assess the cause, and to hopefully provide operators with insight into the potential solutions to digester foaming.

Ad Hoc Committee activities

The association president worked with several members from June through September to organize the workshop idea, develop a committee charge, and form an Ad Hoc Committee. Committee members were selected from nominations provided by or approved by the Operations Committee chairs in each of the three member states of CSWEA – Illinois, Minnesota, and Wisconsin. The committee charge is: "An Ad Hoc Committee will be formed to plan and execute activities to enhance the awareness and knowledge of anaerobic digester foaming. The committee shall explore, develop, and implement a pilot operations workshop on anaerobic digester foaming. The intent of the workshop will be to explore and identify the extent, causes, and solutions to this operations challenge. The committee may also recommend new programs or ideas to promote the awareness and knowledge of this topic." A committee chair then drove the workings of the committee.

From September through December of 2009, the committee held numerous conference calls. The Digester Foaming Ad Hoc Committee determined early on that a survey would be helpful in identifying the scope of the problem of anaerobic digester foaming and to potentially identify commonalities.

The initial kickoff conference call was held on September 30, 2009. Discussions immediately began on holding a late fall 2009 survey and a spring 2010 workshop. Calls were also held November 9 and December 1 to continue the planning with a primary focus on the survey. The committee developed survey questions to assess the digester foaming problem, causes, and solutions. Attempts were made to obtain a list of treatment plants with anaerobic digesters in the three states of Illinois, Minnesota, and Wisconsin augmented where necessary by phone calls to get email addresses. Discussions also continued about the proposed spring workshop. The survey invitations were sent out via email in December.

Six additional conference calls were held between January 25 and April 15 of 2010. The primary focus of those calls was to plan for a workshop on digester foaming. The committee also identified an opportunity to host a separate discussion with Dr. David Jenkins on digester foaming on April 7, 2010 the day after the CSWEA Education Seminar on April 6. The results of the survey were also discussed as they became available. In March, we sent out an email notice and flyer of our April 21 workshop on digester foaming and posted the flyer on the CSWEA website.

Web-based survey

A relatively brief survey was created and specifically designed so responding operators could complete the survey within a very few minutes without the need to reference a lot of technical

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information. Using the Survey tool available from the association's web-based email marketing service, Constant Contact, resulted in the development of simple, multi-choice response survey, along with the ability to add comments if desired in text boxes. Of the responses received, most included comments providing additional information on their specific process or their own insights into the digester foaming phenomenon.

The survey began with general process questions, followed by more specific anaerobic digestion questions. Following are examples of the survey questions:

1. Facility Name and Location, Contact Person and Contact Information.

2. Does your facility operate anaerobic digesters?
   Y/N (if No, you need not complete the survey)

3. Treatment Plant Flow, MGD (current average daily flow) 0.01 to 1.0 MGD,1 MGD to 5 MGD, 5 MGD to 20 MGD, 20 MGD or larger.

4. What type of anaerobic digestion system do you have?
   [ ] Standard single stage mesophilic (may be followed by unheated secondary digesters)
   [ ] Single stage thermophilic
   [ ] TPAD (thermophilic/mesophilic phased digestion)
   [ ] Acid Phase followed by methane phase
   [ ] Other Comment:

5. What is the approximate total detention time in the primary digesters? (Do not include unheated secondary digesters), 1 to 10 days, 11 to 20 days, 21 to 30 days, 30 or more days.

6. What is the secondary biological process used at your plant? Activated sludge, Trickling filters, Rotating biological contactors, Oxidation ditch, Other, Comment:

7. Does your plant remove nitrogen?
   Yes - Ammonia Nitrogen, Yes - Total Nitrogen, No

8. Does your plant remove phosphorus?
   Yes - Chemically, with iron or alum, Yes - Biologically, No

9. Has your facility experienced foaming in the digesters in the last ten years?
   Yes, No

10. Was the cause of the digester foaming determined?
    Yes, No, N/A

11. Do you have foaming in an activated sludge system?
    Yes, No, N/A

12. What type of digester mixing system do you have? Draft tube mixing (liquid), Cannon gas mixing system, Gas lances (such as Envirex Pearth system), Pumped or jet mixing system, Other, Comment.

13. Are you willing to provide operational data to the committee to assist in evaluation and further understanding of digester foaming?
    Yes, No

14. Would you be interested in a one-day or half-day workshop on the subject of anaerobic digester foaming problems?
    One day, Half day, No, Other, Comment:

15. Comments: Please add any additional information describing your experiences with anaerobic digester foaming and/or how you may have dealt with the problems. Would you like to add a comment?
    Yes, No, Comment:

The committee obtained contact information for WWTPs with anaerobic digestion from the Illinois Environmental Protection Agency, the Minnesota Pollution Control Agency, and the Wisconsin Department of Natural Resources. A total of two hundred and three (203) survey invitations were sent out with a number of reminders sent to non-responding facilities. Follow-up telephone calls were made to plants that had not responded to the survey. Eventually, we recorded one hundred and two (102) responses, which is a remarkable response rate for any type of survey. In evaluating the data, it was determined that we had received multiple responses from the same facilities in some instances. After this review, valid responses from 94 separate facilities were included in the survey results.

Survey results

It should be noted that the data was not evaluated for statistical relevance, and data verification was not conducted to determine data validity. The purpose of the survey was to collect grass-roots-type

FIGURE 1 Foaming vs. WWTP capacity

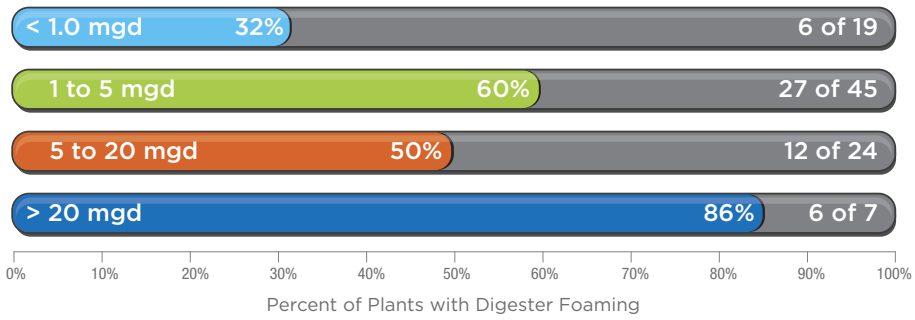


FIGURE 2 Foaming vs. P removal

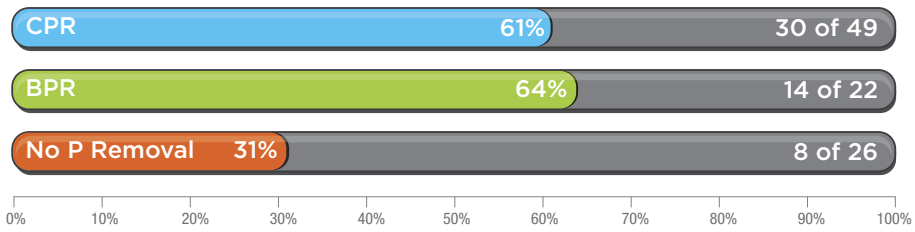
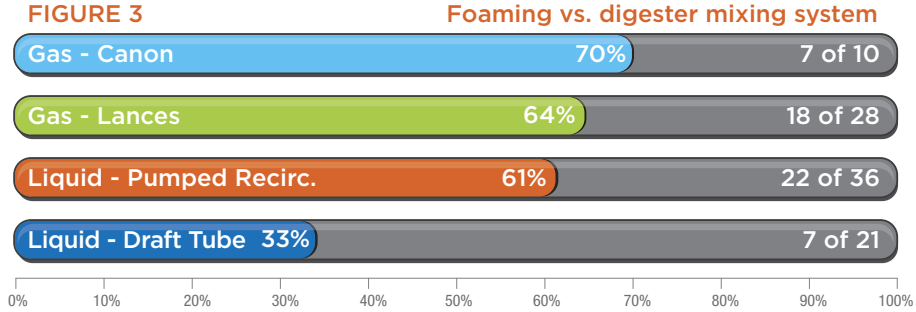


FIGURE 3 Foaming vs. digester mixing system



information from plant operators to begin to demonstrate the extent of the problem, to garner interest by affected plant operators, and to assess whether obvious digester foaming trends could be identified based on the following parameters:

- Size of WWTP
- Type of liquid biological treatment (activated sludge, trickling filters, RBCs)
- Whether foaming in the activated sludge was present
- Whether the plant was operated to remove nutrients (ammonia, TN, P)
- Type of anaerobic digestion (conventional, thermophilic, TPAD, acid-gas)
- Digester detention time
- Digester mixing system

Of the plants contacted, 94 plants (46%) completed the survey and provided useful data and information. Raw data results (including all comments) were downloaded into an Excel format file and analyzed by the survey results sub-committee. Initial survey results were published in the Spring issue of *Central States Water* magazine as part of an article announcing an upcoming Digester Foaming Workshop sponsored by this committee. The data indicated the following trends (among others):

- 50 WWTPs (53% of replies) had significant digester foaming problems within the last 10 years.
- In about half of the foaming cases, the cause of the problem was not determined.
- Nearly all of the larger WWTPs (> 20 mgd) experienced foaming problems (6 of 7 plants), whereas only 6 of 19 small plants (< 1 mgd) experienced foaming problems [Figure 1].
- WWTPs with activated sludge treatment were more likely to have digester foaming (59%) that WWTPs with trickling filters (40%) or RBCs (30%).
- Digester detention time appeared to have limited impact on digester foaming. Foaming was observed in approximately 60% of the WWTPs that had detention times of less than 10 days as well as in plants with detention times of great than 30 days.

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- More than 60% of the plants that remove phosphorus experienced digester foaming, whereas about 30% of the plants with no phosphorus removal experienced foaming [Figure 2].
- Approximately 60% of the plants that remove ammonia experienced digester foaming compared to 38% of plants without ammonia removal.
- A slightly higher percentage of plants that have activated sludge foaming problems experience digester foaming problems compared to plants without activated sludge foaming problems (70% vs. 58%).
- The majority of respondents have conventional mesophilic digestion facilities, and 56% of conventional systems experienced digester foaming. One plant has a thermophilic-only digestion system (no foaming) and two plants have acid-gas digestion (also no foaming in either plant). TPAD system operators reported foaming in 3 of the 7 installations (43%).
- Digester mixing type appears to favor the liquid draft tube style [Figure 3].

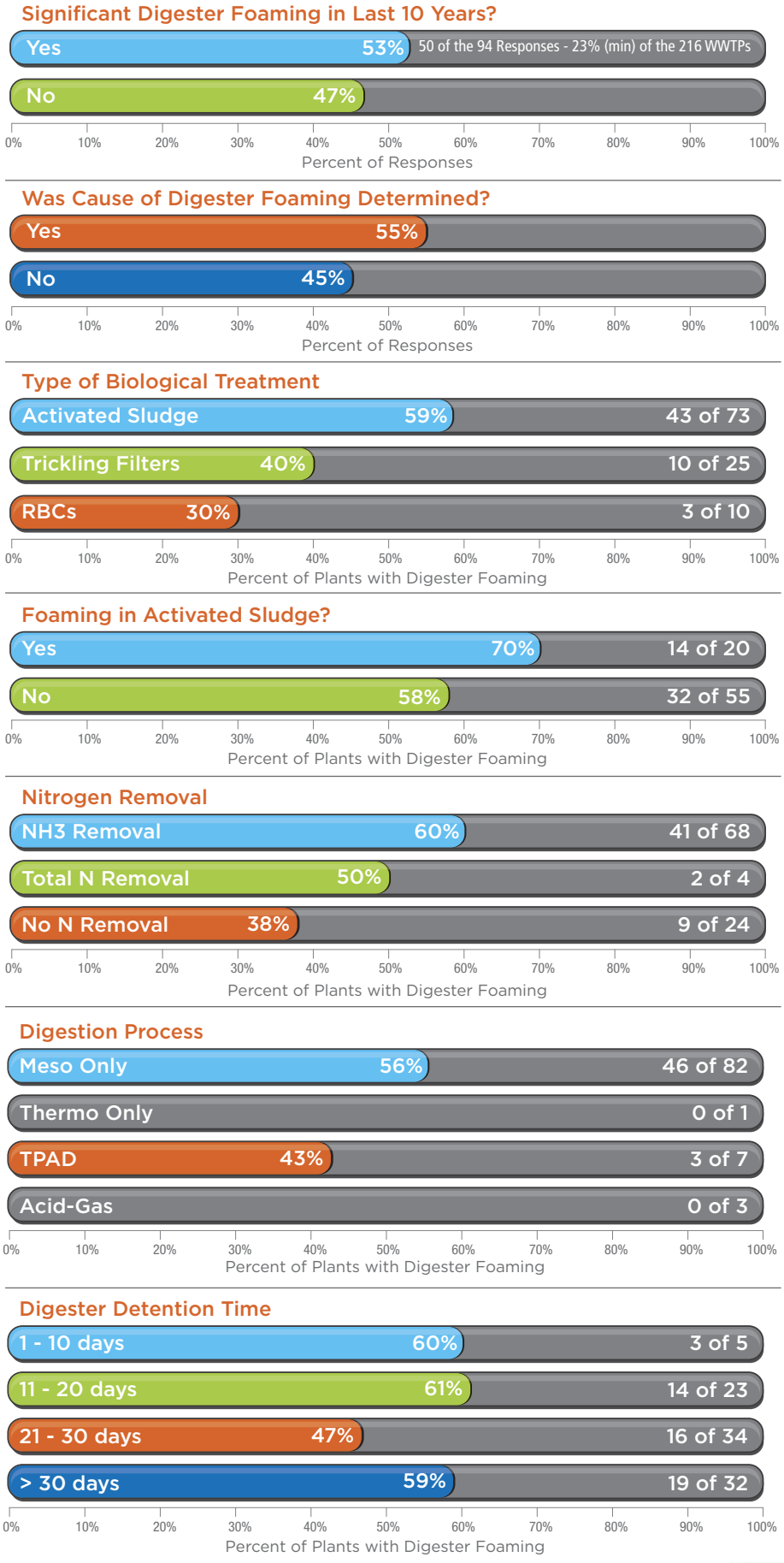
Other data graphs are provided in the Appendix.

Workshops

An initial meeting was held on April 7, 2010, the day after the associations' highly successful Education Seminar. Dr. David Jenkins met with 23 interested individuals to discuss his thoughts on causes of, and solutions for, digester foaming. The information exchange was excellent and focused on biological causes of foaming.

On April 21, 2010, a workshop was held to discuss the results of the data collection activities to-date and to encourage discussion among participants. Approximately 50 interested members attended this workshop. The workshop began with presentation of the data trends and summary of activities previous to the workshop. Two presentations followed from professors UW-Madison and the Illinois Institute of Technology, both of whom are studying digester foaming issues. Following the presentations, the attendees were divided into four breakout groups to discuss potential causes and solutions to digester foaming. The groups were charged with identifying potential foaming causes, possible solutions, and were asked to identify what future data collection would be most beneficial. Each group summarized and presented their discussion to the larger audience at the end of the workshop. The four groups identified over a score of probable causes and slightly more possible measures to mitigate and adapt the digestion operation and design for foaming. Primary, common causes identified included gas mixing, filamentous organisms (Microthrix and Nocardia), and loading variability. Some of the other causes identified included:

- Surfactants
- Fats, Oils, and Grease (FOG)
- Biological phosphorus removal
- High energy pumped mixing
- Chlorination of RAS for activated sludge aeration foam control



Workshop participants noted that the means to address foaming can be categorized in similar terms as those used by those trying to address climate change: mitigation and adaptation. Mitigation being the operating procedures that can be taken to prevent or minimize the formation of foam. Adaptation being the design features or operating procedures that can be incorporated to minimize the problems caused when foaming occurs. Some of the possible solutions identified were:

- Digester feed control minimizing loading variability
- Observation and control of the activated sludge process to eliminate or minimize the presence of probable foam causing and filamentous organisms
- Better mixing
- Mixing control including cycling mixing on/off,
- Provide for surface removal of foam
- Provide foam/scum breaking capability

Conclusions and next steps

An active Association and Ad Hoc Committee were able to assist treatment plant operators with the assessment of a significant operating problem. Through a relatively simple survey and two workshops, excellent information was obtained on anaerobic digester foaming, potential causes, and possible solutions. Participants offered positive comments on all of this and enthusiastically supported continuation of this committee. They also supported this kind of survey and workshop as being valuable to plant operators.

The Digester Foaming Ad Hoc Committee has since been reappointed and is actively planning additional data collection and workshops. The next round of data collection is focused on assessing operational and physical parameters in more detail. A new survey will be developed and disseminated to the same plants that were originally contacted, and the committee will follow-up with WWTP operators that indicated a willingness to provide additional data. Future workshops are expected to include in-person events and webinars hosted by the volunteer committee. CS

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The Thermal Standard in Wisconsin

By Jon Butt, PE, SYMBIONT

Introduction

The State of Wisconsin has issued water quality-based standards regarding point source thermal discharges into receiving waters. Specifically, the changes that took affect October, 2010 can be found in chapters NR 102 and NR 106 of the Wisconsin Administrative Code. NR 102 contains the temperature values for receiving waters that provide water quality for the protection of aquatic life and human health and NR 106 contains information on the determination of water quality-based permit limits. The revised standards are challenging to understand and complicated to implement. DNR has prepared a guidance document to help permit holders and permit writers understand details of the new requirements. This document is 179 pages, including relevant sections from NR 102 and NR 106.

Who is affected?

All who hold WPDES permits will be subject to a thermal investigation to determine if limits are necessary to protect human, fish and other aquatic species. Such thermal limits will be phased in through the permit renewal process. Notice of permit renewal triggers action by DNR to calculate thermal impacts from effluent discharges to determine if limits are necessary.

What steps are involved with determining thermal limits?

There are four steps:

Step 1: Completion of preliminary analysis by DNR

Step 2: Determination of ambient temperature of receiving water by DNR

Step 3: Determination of effluent temperature by the permit holder

Step 4: Calculation of temperature limits by DNR

The following paragraphs help explain each step.

Step 1: In accordance with NR 106, this step involves comparing the ratio Q_s:Q_e to values found in Table 1 of NR 106.55 as shown below. Q_s relates to the flow of the receiving water as recorded by U.S. Geological Survey. Normally, this flow is one-quarter of the 7Q10 value (seven-day average low flow which occurs once in 10 years). Q_e is the effluent flow as reported by the permit holder. In most cases for continuous effluent discharges, Q_e is the annual average design flow. Other values for Q_e may be used such as in cases with highly variable flow or where the flow is not continuous.

As shown in the table, the larger the ratio, the less restrictions that may be necessary. The guidance document from DNR in appendix D contains preliminary values for Q_s, Q_e, and the Q_s:Q_e ratio for each WPDES holder.

TABLE 1: Flow Ratio Categories *(As copied for NR 106.55)*

Warm Water and Limited Forage Fish Designated Waters	Cold Water Designated Waters	Effluent Temperature Limitation
Qs:Qe ≥ 20:1	Qs:Qe ≥ 30:1	120°F
20:1> Qs:Qe > 2:1	30:1 > Qs:Qe > 2.5:1	120°F or the sub-lethal WQBEL as calculated in par. (b), whichever is lower
Qs:Qe ≤ 2:1	Qs:Qe ≤ 2.5:1	Sub-lethal and acute WQBELs as calculated in par. (b)

NR 106 contains information for permit holders that wish to provide alternate data for Q_s. Any permit holder that may wish to provide alternate data should review the thermal guidance document or refer to NR 106 for more information.

Step 2: This step uses the background temperature information found in NR 102. The background temperature information was determined from data collected by U.S.G.S. through a long-term monitoring program. NR 106 does allow permit holders to provide site-specific temperature data as long as the data conforms to requirements in the chapter. DNR has detailed the requirements in the thermal guidance document.

Step 3: Permit holders will be required to provide temperature data for the effluent discharges. If a permit holder is unable to provide such data, the Administrative Code requires DNR to assume thermal limits are necessary until such time when data becomes available. NR 106 outlines specific testing requirements for the collection of the temperature data. Most permit holders have found it helpful to install 24-hour 365-day monitoring and recording equipment to ensure compliance. Note that if continuous monitoring is used, data acquisition must occur every 15 minutes or less.

Step 4: DNR will use the information from steps one through three to determine if thermal limits are necessary and what the thermal limits should be. Thermal limits will appear as a monthly value and likely will vary throughout the year.

What can you do?

If you are a permit holder, there are a number of things that you should be doing in order to better understand and to be better prepared for any changes that might result from the revised thermal requirements.

If you have not already done so, begin recording your effluent discharge temperature. The more data you have, the better off you will be. Make sure that the data is collected in compliance with NR 106 requirements. Consult the DNR's Thermal Guidance document for more information.

Consider monitoring the temperature and flow rate of the receiving water. The U.S.G.S. data may not accurately reflect the conditions of your receiving water. The more site-specific data you have, the stronger your case will be if you need to challenge the DNR's results.

Maintain accurate records of effluent flow, beyond simply recording the average daily flow. Hourly variations of flow may impact discharge temperature and may prove important.

Consult with an environmental engineer to estimate what effect the new thermal requirements might have on your operations. The more information you have, the better prepared you can be when the time comes to renew your permit.

Open lines of communication with DNR. The more you can discuss your situation with DNR, the better your understanding of the impact of the standards will have on your operation.

Conclusion

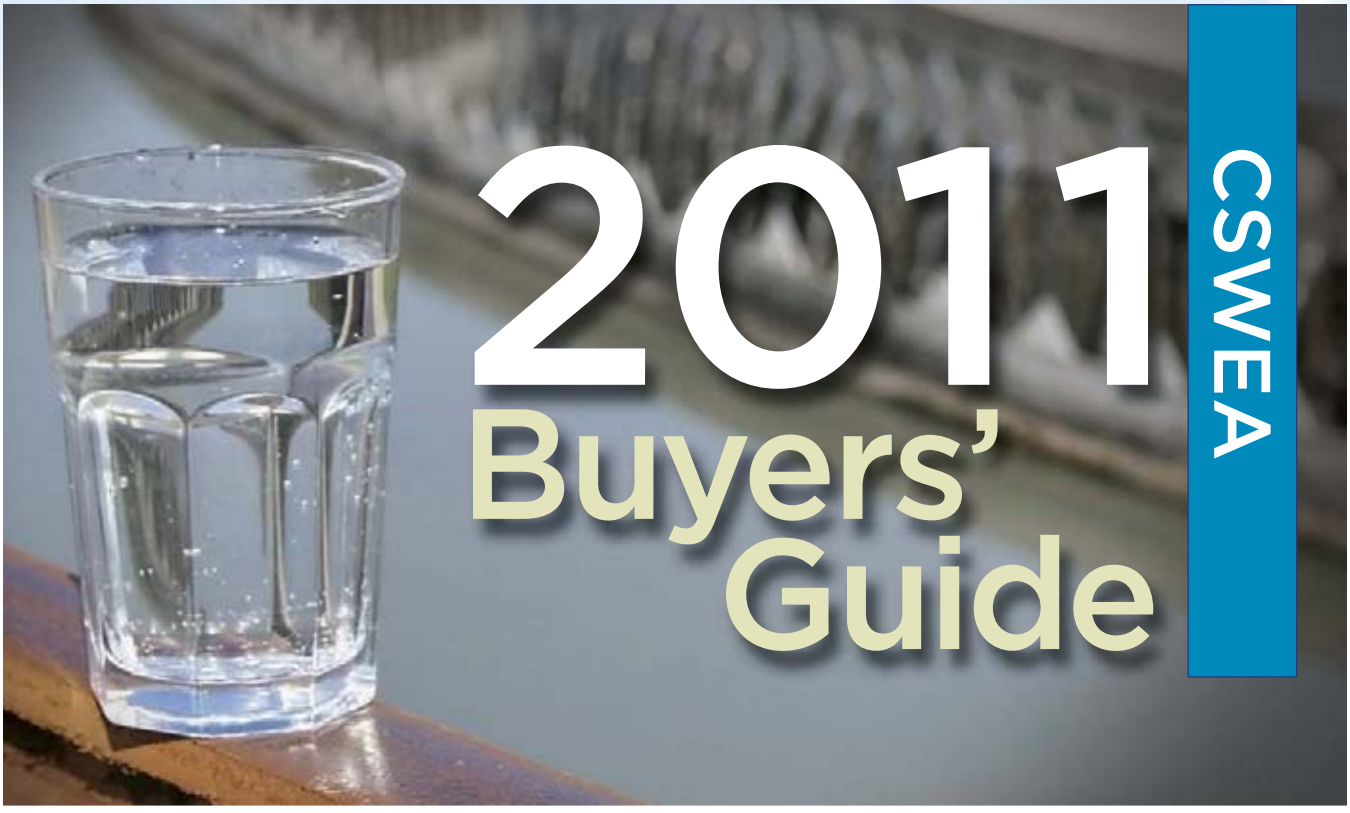
The State of Wisconsin has revised the thermal standard for all permitted effluent discharges. The impact of the revisions is not known but at a minimum all WPDES effluent permitted discharges will have to be analyzed to determine compliance with the water quality requirements found in NR 102. If the analysis determines the need for reducing thermal discharges, limits will be added to the permit based on the requirements in NR 106. DNR has prepared a guidance document to help explain the revisions. All permit holders are encouraged to begin collecting temperature and flow data for both the effluent discharges and the receiving water to help ensure that accurate, site-specific data is used to determine permit requirements.

Acknowledgement

The author wishes to acknowledge the contributions of Amanda Boyce of Wisconsin DNR for her review and comments on this article.

A copy of the guidance document can be obtained from the DNR website using the following: *http://www.dnr.state.wi.us/org/water/wm/wqs/thermalrulesrevisions.htm*

For more information, contact Jon Butt, PE at 414-291-8840 or *jon.butt@symbiontonline.com*. CS



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Our CSWEA Buyers' Guide consists of **two sections:**

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

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Cynthia Welsh

Receives CSWEA's 2011 Boyle Educator of the Year Award

Dr. Cynthia Welsh EdD, personifies all the characteristics that the Bill Boyle Educator of the Year Award was designed to honor. Dr. Welsh is a science teacher at Cloquet High School and Middle School, Minnesota. In addition to her rigourous role as classroom teacher and curricula developer, she supports programs and students in research and educational advancements outside the class. We have been fortunate to have her talents nuturing the minds of our next generation of water professionals, shown by the dedication and success of her students at the SJWP and other science fair events across the country. Her talents to engage young minds in scientific inquiry is inspiring. The list below speaks to the few she has motivated – think of the other young minds that she has likely influenced with her classroom instruction or by other teachers that use her curricula.

Along with her impressive résumé, the list of students she has supported in SJWP research are just a small part of her teaching accomplishments. She also supports students in other science competitions and venues, many of which have her traveling around the country.

CS Water: What inspired you to become a science teacher and your focus on water?

Dr. Welsh: Initially, I was a clinical laboratory technician; I worked in a doctor's office and a hospital lab. After having three children I was a stay-at-home mom. For those 12 years, I took classes at the local college, initially to get out of the house while also fostering my love of learning. I love being with children and learning about science, so being a science teacher just made sense.

Living in Minnesota, the land of 10,000 lakes, I grew up fishing on many lakes and streams in northern Minnesota. When I was an undergraduate student, I took graduate level water-related science classes. When I started helping students with science research, my love and expertise in water science was passed on to my students.

CS Water: How do you inspire your students to conduct such in-depth research projects, that rival undergradute (and some graduate) level projects?

Dr. Welsh: I work initially with all my seventh-grade students on research projects and continue to work with some of these same students who find they have a passion for this type of work. All of the students who participated in the SJWP worked with me on research as a seventh grader and continued their work until they graduated. All of my seventh graders have to do projects, but no one has to participate in science fair-type events. Last year, out of 130 seventh grade students, 50 decided to participate in the regional science fair, and 14 high school students continued to do projects. Doing this type of extended research takes a lot of time and dedication; I want the student's passion and interest to foster continued participation, not a grade or some kind of "extra credit." When students are allowed to work on topics that interest them, in ways that are meaningful, a teacher does not have to do much to challenge a student to work hard on tough topics. They want to work hard. I have students who ask me to stay after school, work on weekends or during Christmas break. It is unbelievable the passion they have for their own work. These students take advanced science, math, and engineering classes in high school. They see the

connection between their passion for their project and what rigorous academic classes have to offer. Just this last year, all of my graduating seniors' research projects led them to the major they declared for college. Without the option to do research on topics they were interested in, these students may not have realized what they wanted to study until after spending two or even four years in college.

CS Water: What types of hands-on experiences do you provide for your students?

Dr. Welsh: I am a classroom science teacher and a grade 7-12 science research mentor. I am going to answer your question in the context of these two roles. As a seventh grade life science classroom teacher, using the Minnesota State Science Standards for seventh grade life science as a starting point, I design all of the units/lessons taught using a constructivist approach. Units are organized so that students work from what is concrete (what they know, i.e., the big picture – for example, start with the human body) to abstract (move from the human body to studying cells). When I am designing my daily lessons, the other seventh grade teacher in my building and

I, try to transform cookie-cutter activities into inquiry-based discovery learning opportunities. When I taught in Duluth, my students focused on learning about ecology using Lake Superior as our base of study. Working with the Lake Superior Center, and scientists from the Environmental Protection Agency, local limnologists and stream ecologists came into my classroom sharing their expertise and loaned us sampling equipment. We were able to walk to a local stream and learn how to collect data. We took a field trip to Lake Superior's harbor and collected lake data. In the classroom we used this data collection and analysis as a template for each student's individualized project.

CS Water: What has been your most satisfying experience or accomplishment as a teaching professional?

Dr. Welsh: My most satisfying experience is watching my students improve their research skills over the years. Many teachers only have their students for one year. I am fortunate to work with hard working passionate students for six years. To show our school board the work we are doing each year, a few of my students will put together five-minute presentations. We start with my seventh graders presenting and work our way up to the seniors. The depth of their projects and their presentation skills gradually improve, until as you mentioned before, the high school students are doing graduate level research presentations.

I would have to say my most satisfying accomplishment happened this last fall when one of my high school research students was asked to fly to Washington, DC for the first White House Science Fair, where she was able to meet Presidant Obama. It was the most exciting thing that has ever happened to me, even though only the student was allowed to attend.

CS Water: Do you have faith in our young students' ability to solve those environmental problems they will inherent?

Dr. Welsh: I have faith that my students will preserve in working to solve the environmental problems they inherit. Learning the *process* of how to do science research will light their way. Their projects usually take many twists and turns along their six years of research. Students hit road blocks, get discouraged, but the passion they have for their research helps them weather those storms; ultimately, carrying them to the pot-of- gold at the end of each storm's rainbow. Doing research is a process that enhances life skills that serve students well in the adult world. They learn how to talk to adults, how to share and explain in simple terms what they are studying. They learn that failure often is the best road to success, to keep their eye on the next task at hand without getting overwhelmed by all that life asks of them. Essentially, they learn how to be successful at whatever they decide to do.

CS Water: What can the water profession do to better support students and inspire students to pursue careers in water?

Dr. Welsh: In order to inspire young students to pursue careers in water-related sciences, administrative, parental, community and professional support and assistance are essential. CSWEA and WEF are some of those crucial professional links that helps connects my students with the expertise, skills and sometimes equipment, necessary for good research. CSWEA and WEF can better support students by just continuing to support student participation in the Stockholm Junior Water Prize, and making available lists of professionals willing to help guide the way.

Students supported by Cynthia Welsh for the SJWP

2001-02, 2002-03, 2003-04

Elizabeth Welsh: Attended the SJWP national competition three times. Was one of the four national finalists the last two times. Won two third-place grand awards at ISEF, one fourth-place grand award at the Intel International Science and Engineering Fair (ISEF), twice advanced to the National Junior Science and Humanities Symposium.

She is now a graduate student in water natural resources with a focus on chemical limnology at the Large Lake Observatory (LOL) at the University of Minnesota, Duluth. Her research is about the effect of photodegredation on carbon in the streams entering Lake Superior. She is in the application process for a PhD in chemical limnology on photodegredation of carbon along with community outreach.

2006-07

Kevin Robertson and Sara Gleason: SJWP Minnesota runner-up

Robertson, K. and Gleason, S. (2007). *The use of a rain garden to control road run-off.* Central States Water Environment Federation. *www.cswef.org*

Kevin is attending Northland College in Ashland WI, majoring in environmental science. Sara Gleason is attending nursing school.

Rupa Erie: The MN SJWP runner-up for her work on the effect of ibuprofen on *Daphnia major.* Rupa is attending UMD with an undecided major.

2007-08

Logan Pallin and Sara Gleason: MN state representative at the 2008 National SJWP.

Pallin, L. and Gleason, S. (2008). *An analysis of predator-prey macroinvertebrate interactions on Scanlon Creek with the use of a rain garden to diminish the impact of urban road run-off: Phase II. Minnesota Entry into the Stockholm Junior Water Prize www.wef.org*

2009-10

Logan Pallin: MN state representative at the 2010 National SJWP.

Engineering a Rain Garden to Control Road Run-off in Scanlon Creek and an Assessment of Rain Gardens as the Best Stormwater management practice – Phase IV.

Logan Pallin is currently attending Duke University (full scholarship) majoring in environmental engineering. Three-time Intel ISEF Participant, two special awards; three-time ISWEEEP participant with placement medals each year. Four-time National American Indian Science and Engineering Society where he was the top grand award winner multiple years. CS

Strategic Plan Updates

By Jane Carlson

I hope you're having a great summer reconnecting with friends, family, colleagues, and water. I will give a summary of several of our Section's activities and plans.

The July Central States Exchange (CSX) meeting in Wisconsin Dells was productive and fun. You'll find a more complete CSX report in this issue of *Central States Water*. I'd like to thank Beth Vogt, Eric Lecuyer, and the association board for preparing a thoughtful meeting agenda and promoting active participation. CSX is open to all members and is highly encouraged for Section board members and committee chairs. It happens in mid July every year.

Vice Chair Bill Oldenburg has formed a committee and is updating our Section's Strategic Plan. Please let Bill know if you have specific suggestions regarding the plan. Copies of past updates are posted on our website. Keith Haas and the Section board will be updating our *Wisconsin Section Policy and Procedures Manual* to improve the way seminar finances are handled and to make a few other minor updates.

The Collection Systems Seminars (Classic and Northwoods), Pretreatment Seminar, and Management Seminar were well attended and received great reviews. The Young Professionals Brewers Outing organized by Mulcahy-Shaw was as fun as ever. It was a nice mix of both young and seasoned professionals and even a few out-of-state visitors who politely cheered for the Crew. Sincere thanks to the committees, vendors, and members who make these events enjoyable and excellent learning and networking opportunities.

The Wisconsin Department of Natural Resources (WDNR) has not been idle this summer, either. A summary of current regulatory issues can be found in our Government Affairs Committee's report posted at *http://www.cswea.org/wisconsin/committeereports/*. The WDNR has completed a framework for water quality trading at the request of the Natural Resources Board. We've also been told the WDNR has prepared a draft guidance document for implementing the new phosphorus rules into Wisconsin Pollutant Discharge Elimination System (WPDES) permits. This guidance document may be released for public comment in late summer. The WDNR is now working through their backlog and reissuing permits including new phosphorus limits.

On the total maximum daily load (TMDL) front, the WDNR is almost finished preparing responses to the public comments received on the Rock River Basin and Lower Fox (Green Bay) Basin phosphorus and sediment TMDLs. They expect to submit the final TMDL reports to USEPA for approval in late summer or early fall. These TMDLs will result in effluent limits for wastewater treatment plants ranging from 0.075 mg/L to 1 mg/L. Many stormwater permittees (MS4s) will need to remove additional phosphorus and total suspended solids. The TMDLs also require significant agricultural load reductions. The WDNR completed TMDLs in the Red Cedar Basin this summer, as well. It appears these will not have as significant an impact on treatment plants and MS4s. Other watershed-related news can be found in our Watershed Management Committee's report on our website.

Congratulations to Joan Hawley for earning the Water Environment Federation Collection Systems Award, and to Trevor Ghylin for the Canham Scholarship Award. These prestigious national awards will be presented to Joan and Trevor at WEFTEC this fall, and we are very proud of them.

Our Annual Business Meeting is scheduled for November 10 at Cabela's in Richfield. At the Annual Business Meeting we encourage our committees to meet face-to-face and we welcome all members to attend. If you are thinking of joining a committee and are not sure which one, this is a good opportunity to explore your options. The Watershed Management Committee, led by Julie McMullin, has again scheduled a webinar before the meeting and the main topic will be TMDLs. This webinar was a great success last year with many attendees in person at Cabela's and many others participating via computer. I hope to see you there. Bring a colleague with you! CS

Strengthening Our Section

By Dean Wiebenga

As I write my second chair's message, I am trying to recall everything that we have done this past summer within the Illinois Section. It has been a very active summer with planning of technical seminars to be held later this year.

First of all, Jim Kerrigan, Greeley and Hansen, did a great job of organizing the YP Event at Top Flight Golf Academy. Thanks for all of your hard work.

Illinois Section will be participating in World Wide Monitoring Day, thanks to Roger Gyger, Public Education Chair, and we have purchased several kits for distribution. We are excited to have a couple more groups to distribute the kits to so our participation continues to grow.

Jim Huchel, City of Crystal Lake and his Operations Committee have their annual Operations Seminar September 7, 2011 at the Thorn Creek Basin Sanitary District. This year's event will be unique, pitting the engineers versus the operators when troubleshooting operational problems within the plant. Attend this event to see who comes out on top.

"Illinois Section will be participating in World Wide Monitoring Day, thanks to Roger Gyger, Public Education Chair, and we have purchased several kits for distribution."

Laboratory Chair Mary Dressel, from Downers Grove Sanitary District, and Industrial Pretreatment Chair Randy Patchett from Burns and McDonnell, are working on the speakers for a Technical Program in mid November. Stay tuned for a specific date and location.

Also, coming in November is the Safety and Maintenance Seminar held at the City of Naperville, Illinois. Doc Burke of Chesterton and Gary Scott of the Glenbard Wastewater Authority are working on a program that will be hard not to attend.

Moving forward in the Illinois Section, we previously stated our goal was to grow our committee rosters to strengthen our Section. It does take some effort and commitment to make this work. Our next goal is to get more people involved and attend one of the technical programs we offer. There is no better way to promote your profession than to get involved in Section activities. It is a great way to share your skills, knowledge, meet new friends and have a lot of fun along the way. The more people we have involved, the easier the task becomes (typically the better the party, too).

We look forward to seeing as many of you as we can at WEFTEC in Los Angeles. CS

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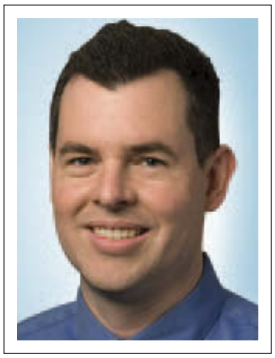
Here Comes a Regular

By John Friel



By now summer has passed and some leaves may have fallen, but I hope there are plenty of enjoyable days left before winter is upon us. As I write this, I am amazed to realize the new school year will be starting in just over a week. In retrospect, it turned out to be another interesting summer in Minnesota that included the state government shutdown, the repair of the Metrodome roof, and a heat wave with the highest dew point on record. All the while the young, old, and regulars of CSWEA and the Minnesota Section kept working hard on conference plans and committee activities that will make this another enjoyable and eventful fall and winter. Here is a brief recap of some of the major MN Section summer events along with some notes about upcoming fall and winter events.

In July, the 2011 MWOA Annual Conference was held again in Grand Rapids, MN. The event brought over 100 engineers, operators, and vendors to the great north. Linda Mullen became the new MWOA president and Chris Kleist became the new vice president. As part of the conference MWOA and the MN Section of CSWEA jointly sponsored and awarded four scholarships to worthy St. Cloud and Vermillion Technical College students.

Also in July, I had opportunity to attend the annual CSWEA CSX&YPX 2011 event at the Kalahari Resort in the Wisconsin Dells with Rob O'Connell, Doug Henrichsen, Patti Craddock, and Jim Miller from Minnesota along with more than ten other Wisconsin and Illinois officers and representatives. The CSX exchange was a valuable event to share ideas and information and to develop stronger connections with our neighboring state section counterparts. I was impressed to learn how involved some of the current officers have been over the years with CSWEA and the State Sections. Please check out the meeting minutes for more details.

The plans for the 26th Annual Conference on the Environment (COE) to be held on November 9 are set. COE is a comprehensive one-day conference covering air, water, and waste issues affecting MN and the country. Ted Field and Greg Archer have done a great job co-chairing the COE planning committee. One of the sessions will discuss the somewhat unique topic of Minnesota regulations related to sulfate discharges. Northern Minnesota is known for wild rice and mining and it turns out new research is planned to revisit how sulfate discharges in wastewater impact receiving waters that include wild rice stands. Please see the COE announcement in this issue and visit the *www.CSWEA.org/Minnesota* events page to register for the conference and find more conference details and information.

Please mark your calendars for Wednesday, February 15, 2012 for the 29th Annual Innovative Approaches to Wastewater Operational Problems Seminar to be held again in St. Cloud. Tim Korby has done a great job as the new Operations Committee Chair and deserves many thanks along with the rest of the planning committee.

In addition to the annual conferences, the Student and Young Professionals (S&YP) Committee had another outing to a St. Paul Saints baseball game in August. The committee continues to plan events about every quarter. Please spread the word to young professionals that there are more opportunities and events forthcoming and encourage their involvement. It should also be noted that the *Liquid Assets* documentary will likely be completed this year. Updates will be provided at the COE and Innovative Conferences. Please check out the *Liquid Assets* website and blog, *www.blueprintMN.com,* to read more about the documentary production.

Fortunately, the MN section and CSWEA committees are all chaired by very talented people and the regulars of the section. These regulars are essential and provide the consistency and continuity that keep the organization running. But like any team, new players are always needed to build a stronger bench and give the team a better chance for growth and continued success. I would like to encourage each MN Section member to please consider joining one committee of interest. If possible, try to encourage a coworker or friend to get involved at the same time. Everyone has skills that can benefit the organization and I hope in return the experience will benefit the member personally and professionally. Please contact any of the committee chairs directly or me, if you are interested in becoming involved.

If additional committee involvement is not your interest, or the timing is not right this year, please consider submitting a nomination for a CSWEA and/or WEF award. There are several awards that WEF and CSWEA have to recognize the many accomplishments of the people in our industry. Please note award nominations and submittals need to be made by December 1. Thanks again for your interest, and hopefully we'll see you soon at an upcoming conference or committee activity. CS

But like any team, new players are always needed to build a stronger bench and give the team a better chance for growth and continued success.

OCTOBER

CSWEA-IWEA Welcome Reception
October 16, 2011
J.W. Marriott at L.A. Live
Los Angeles, CA

WEFTEC'2011
October 15-20, 2011
Los Angeles, CA

MN Section & MWOA Annual Lab Seminar
October, 2011 (Date TBA)
Saint Peter Community Center
St. Peter, MN

NOVEMBER

MN Section CSWEA-A&WMA Conference on the Environment
November 9, 2011
Earl Browne Heritage Center
Brooklyn Center, MN

WI Section CSWEA Watershed Management Committee Webinar
November 10, 2011
Cabalas, Richfield, WI

WI Section Annual Business Meeting
November 10, 2011
Cabalas, Richfield, WI (following Webinar)

IL Section CSWEA & ISWWG, Lab/Industrial Pretreatment Seminar
November 15, 2011 – 9:00 am - 2:15 pm
Burns and McDonnell offices
Downers Grove, IL

IL Section CSWEA Safety and Maintenance Seminar
November 16, 2011 – 8:00 am - 3:00 pm
Village of Naperville, Training Center

FEBRUARY 2012

MN Section & MWOA Innovative Conference 2012
February 15, 2012
Holiday Inn
St. Cloud, MN

APRIL 2012

CSWEA 2nd Annual YP Leadership Academy
April 2, 2012
Monona Terrace
Madison, WI

CSWEA 17th Annual Education Seminar
April 3, 2012
Monona Terrace
Madison, WI

MAY 2012

CSWEA 85th Annual Meeting
May 14-17, 2012
Pheasant Run
St. Charles, IL

MINNESOTA AND WISCONSIN S&YP EVENTS

The Minnesota Section Students and Young Professional Committee went to a St. Paul Saints baseball game. The August social outing was arranged to attract members, increase involvement, and network. Those pictured are Dustin Maas, Chris Harrington, Mike Peterson, John Chlebeck, Rachel Radloff, Pete Daniels, Susan Danzl, and St. Paul Saints mascot, Mudonna. Not pictured: Mark Stone.

Wisconsin Section YPs at a tailgate party before the Milwaukee Brewers game.

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Home Phone Number	Business Phone Number	FAX Number	
E-mail Address			

Employment Information

Employer	Job Title
Environmental Focus	Other focus or interest (please specify)
Signature (required for all new memberships)	Date

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CSWEA Associate Membership Benefits include: Central States Water Magazine and Member price for CSWEA and Section Events	Dues cover a one year period, and must be renewed annually.	DUES
☐ I am a Young Professional (35 yrs or younger, less than 10 work experience) ☐ Please send me info on YP Events	Renewal notices will be sent one month prior to anniversary date.	$ 20.00

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☐ Check/Money Order enclosed. Make check payable to Central States Water Environment Association.

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Visa, Master Card & American Express Accepted.

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Call 815-954-2714 for additional information or visit www.CSWEA.org

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Member Association (MA) Choice: Central States Water Environment Association

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Environmental Focus		Other (please specify)	
Signature (required for all new memberships)		Date	

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Membership Categories *Select one only*	**Member Benefit Subscriptions Include**	DUES
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YP=<35 yrs of age, < 10 yrs work experience can receive 50% discount for 1st three years of membership	✓ *WE&T (including Operations Forum)*	
	✓ *WEF Highlights Online*	
	✓ *Central States Water Magazine*	
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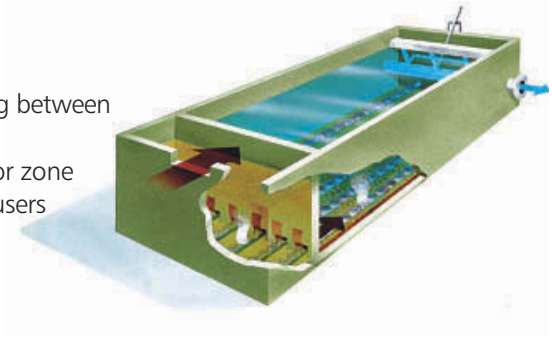

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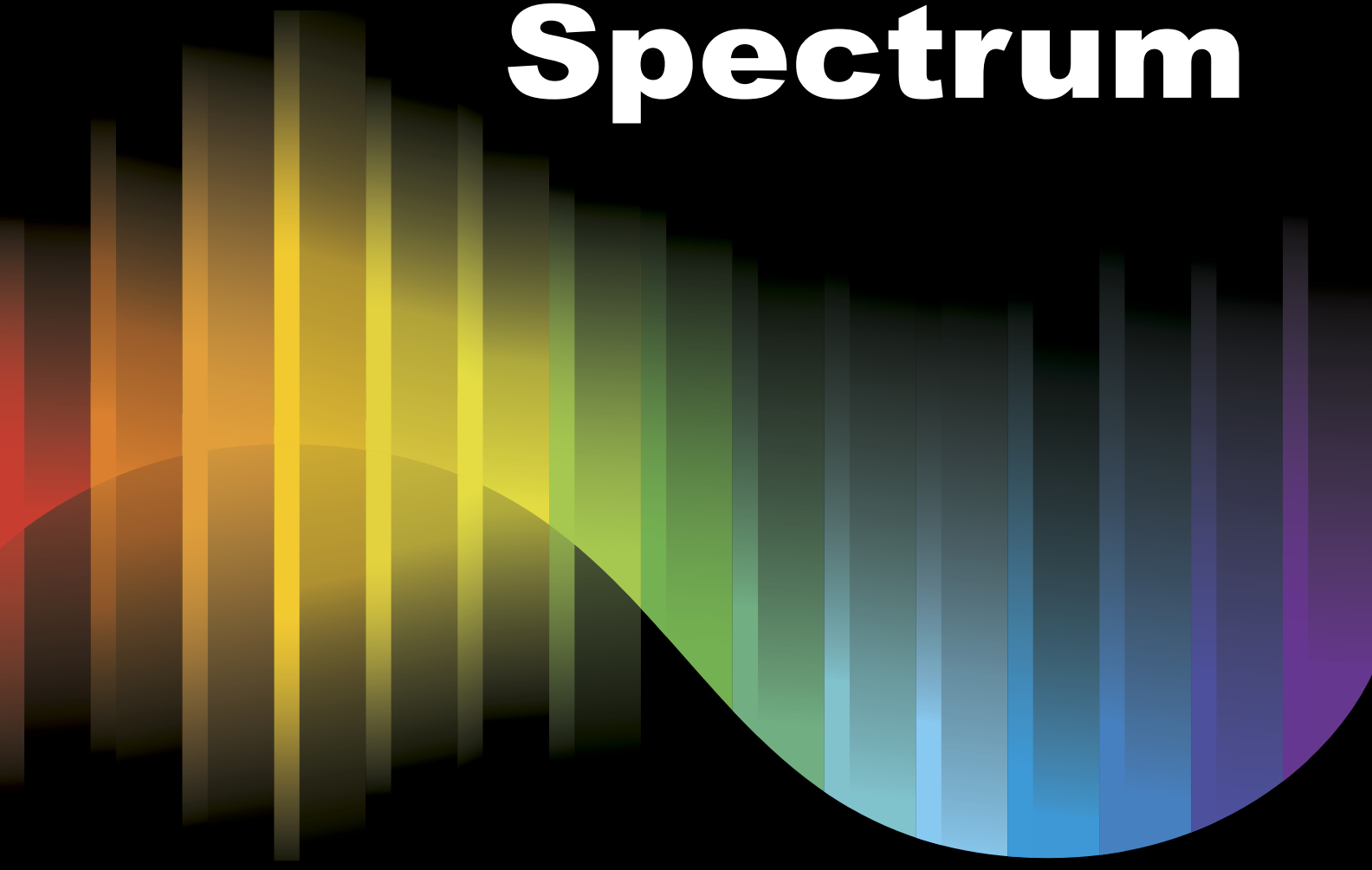
Covering the Spectrum



Donohue & Associates' team of experienced engineers and operations specialists cover the full wastewater spectrum: from the laterals to the treatment facility outfall, from the smallest systems to the largest, from planning to system optimization and troubleshooting, from design to start-up, from municipal to industrial, from dry weather to wet weather, and everything in between.

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