

# CENTRAL STATES WATER

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

PLANT PROFILE:

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*Wastewater*  
Treatment Facility



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# WEFTEC 2008

By Tim Tack



As always, WEFTEC set record attendance and had a record number of exhibitors, confirming not only Chicago is a great place to hold the convention, but also the fact that our industry is attracting more attention. The late October weather certainly cooperated with us this year and many out-of-town visitors were able to enjoy our beautiful city.

Even though I have already attended 11 WEFTECs, I still get the kid-at-Christmas feeling when I walk the exhibit floor. It is just an awesome experience to see all of the equipment on display, witness the up-and-coming technologies, and talk to all of the manufacturers about their products.

As many of you may already know, 2010 starts an every-other-year rotation for WEFTEC in New Orleans and 2013 starts an every-other-year rotation for WEFTEC in Chicago. While it will be great to host this national conference every other year, it also has some potential downfalls for many local and regional organizations like CSWEA that have an annual conference. The leaders of CSWEA recognize this impact and we are already working with WEF to make sure we plan for the future and continue to grow our organizations together.

## MEMBERS AT WEFTEC

As always CSWEA and our members were very busy at the convention. Eighty registered golfers kicked off the show on Sunday at the WEF/WERF golf outing. For this event, we had 34 sponsors of the tournament and we should raise over \$8,000 for WERF. I would like to thank all

of the sponsors as well as Eddie McCall and Mike Beck for their hard work the day of the event.

On Sunday evening Scott Trotter again hosted a joint CSWEA/IWEA reception. This event again had a record number of attendees and would not be possible

without Scott's hard work and the support of the sponsors. This has really turned into the Sunday must-attend event at WEFTEC.

Our two Operation Challenge teams, the Pumpers and Shovelers, again made us proud this year and had a great



showing. Besides both teams doing great overall, the Pumpers managed a third-place finish in the Process Control event. Please give special thanks to the team coaches Rick Ashling and Jim Miller.

CSWEA sponsored two teams for the WEFTEC '08 Student Design competition; one from UW Madison and the other from the University of Illinois. The future of industry looks good, because these students are smart and talented. The design team from U of I did an excellent job presenting and the UW Madison team earned an amazing third place finish. Dan Busch has done an excellent job with the design competition the last few years and he should be congratulated as well.

A few of our members were recognized by WEF for their accomplishments: Dan Zitomer, Marquette won the Fair Distinguished Engineering Educator Medal; Jason Flowers, UW Madison won the WEF Studies Scholarship; and Ken Sedmak, along with co-authors Michael Gerbitz, Thomas Asmus and Larry Reinke won the Gascoigne Wastewater Treatment Plant Operational Improvement Medal for their article titled "From the Inside Out", which is reprinted in this issue of *Central States Water*. Great job guys, you should be proud of yourselves!

As we are still recovering from all the hard work CSWEA members did at WEFTEC, we should be able to sit back and rest on our laurels. Fortunately for the membership, our committees are continuing their efforts fundraising and planning more events.

### WATER FOR PEOPLE

CSWEA is spearheading a Super Bowl raffle/fundraiser for Water for People that has the potential to raise a lot of money for this good cause. If you haven't already participated, please send me an email [tim@leyassociates.com](mailto:tim@leyassociates.com) for details. Do it soon, because the drawing will be December 30.

### CSWEA AWARDS

This year Rusty Schroedel and Jim Miller are in charge of the CSWEA and WEF Awards. This is a great opportunity to nominate one of your peers for their dedication and hard work. Having served on this committee in the past, I can tell you that it is a great feeling to see people recognized for their accomplishments. The nomination process is pretty painless and many of the WEF Awards go without any


nominations. Thus do not be lazy or feel you are not worthy, send in your applications. Further details on the awards and the process can be found in this magazine.

### MIDWEST WATER INDUSTRY EXPO

The fourth annual Midwest Water Industry Expo will be held February 10-11 at the Kalahari resort & Convention Center. This Expo provides a great opportunity, to network with many of the industries professionals and have a fun midweek getaway with the family. As an exhibitor, I can tell you that it is a worthwhile event. Thank you Dan Lynch and Jay Kemp for all your efforts.

### 2009 ANNUAL CONFERENCE

Mark your calendars, because May 18-21 CSWEA will be hosting its annual conference at the Marriot Lincolnshire Resort. Dean Wiebenga is the conference committee chair and he assembled a bunch of talented individuals to serve on his committee. Also, CSWEA has invited the Fox Valley Operators and Illinois Association of Wastewater Agencies to host their meetings during our conference. This event promises to be both educational and a lot of fun.

I look forward to seeing you there. 



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**When receiving cleaning bids** for the exterior of water tanks for the mildew removal, the lower bids are sometimes not always the best deals. In general, the lower bids received do not include cleaning the tanks with the proper cleaning agents. When pressure washing with water only and not using a pre-soak system to kill the root of the mildew stains, this will allow the mildew to start growing back on the tank as soon as six to eighteen months.

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**Midwest Mobile Washers** researches every year to stay in compliance with laws and regulations that may be required from state to state. Our employees are trained with the products that we use through attending educational classes and our supplier support. We also attend organizations in the cleaning and restoration industry to keep abreast and updated on all chemicals and proper procedures in our industry.

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# The Economy and Water

Eric R. Lecuyer



In our last issue of *Central States Water*, we focused on the need to create energy efficiencies to counteract the spiraling cost of energy and now with the current world wide economic crisis, we are again focused on economic concerns. WEF Executive Director Bill Bertera offers his highly insightful thoughts on the role that infrastructure renewal can play in an economic recovery with his article titled "*Public Infrastructure Investments Makes Sense*" a must-read in this issue. With the incoming new administration and the hope and optimism that surrounds President-Elect Obama's election at such a critical juncture for our nation's (and the world's) recovery, we can hope for a grand New Deal that grasps both the role that infrastructure renewal can play in a recovery, as well as the importance of such an investment. In our role as leaders in the water environment profession, it will be incumbent upon us to help guide the best use of any such infrastructure investments to assure that the most-needed projects are funded, rather than the most politically connected projects. We deserve to be optimistic and it is our hope that the collective wisdom of water environment professionals throughout our nation help guide the critical reinvestment in infrastructure to our most critical needs.

Closer to home, water and wastewater agencies, cities and villages, and allied industries of every nature are suffering from the economic meltdown and in some cases drastic budget

cuts are being made at every level. More than ever, maximizing efficiencies and making the best use of every dollar is critical to the survival of small and large utilities alike. Some facilities have been greatly impacted by major factory shutdowns, the loss of long-term revenue generating retail and commercial enterprises. While revenues are dropping, energy and commodity costs continue to inflate. Our very ability to meet expected levels of service is in jeopardy at a time when people will expect and need more from local government. We face difficult times and our resourcefulness and ability to adapt to change will be critical to our survival.

Professional associations like CSWEA will also be impacted as expected restrictions on travel to conference and seminars will result in low attendance at a time when training, education and the transfer of information on survival strategies will be critical for facility operators and managers. CSWEA and its Sections have strong reserve funds and we expect to weather the economic crisis with prudent adjustments to our events. We will also seek to use technology to deliver needed information to our members, whether they can travel to workshops, conference and seminars, or not. We will deliver the services that you need. You are not in this alone; your association will be there for you. Meanwhile, we remain optimistic that our President-elect will effect positive change, resulting in an economic rebound and in the infrastructure renewal that we all agree is far overdue. [CS](#)







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# CSWEA/IWEA's WEFTEC '08 Reception

Once again CSWEA and IWEA teamed up to host the 14th Annual WEFTEC Welcome Reception on Sunday evening at WEFTEC '08. More than 350 members and friends of the two associations attended this fun-filled event which provided a wonderful kick-off to the week's activities. Be sure to thank our many sponsors, who helped defray the cost of the reception and hats off to Scott Trotter for once again planning an excellent event.

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# CSWEA Students Chapters *Student Design Teams* at WEFTEC '08



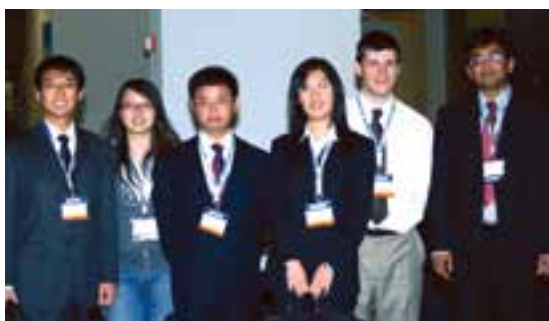
L-R: Joe Klett, Jonas Balistreri, Chanel Kass, Tracey Cadkin and advisor Dr. Jim Park.

## University of Wisconsin – Madison: 3rd Place Winner (\$1,500)

- Presentation: Application of Reed Bed Technology for Nine Springs Waste Water Treatment Plant in Madison, WI
- Team Members: Jonas Balistreri, Chanel Kass, Joe Klett, Tracey Cadkin
- Advisor: Dr. Jim Park
- Sponsored by: CSWEA

## Illinois Institute of Technology: 4th Place Winner (\$1,000)

- Presentation: Water Supply and Distribution System for Pignon, Haiti
- Team Members: Mark Rokita, Algirdas Bielskus, Dhesikan Venkatesan
- Advisor: Dr. Krishna Pagilla
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University of Illinois team.

## University of Illinois – Urbana-Champaign

- Presentation: Retrofit of Wastewater Treatment Plant for Biological Nutrient Removal
- Team Members: Hossain Azam, Bin Guo, James Meissen, Xiaofeng Ye, Xinyu Zhang
- Advisor: Dr. Eberhard Morgenroth
- Sponsored by: CSWEA

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# WEFTEC '08 Operations *Challenge*

By Rob Barnard

**C**ongratulations to the Pumpers and Shovelers representing CSWEA at WEFTEC '08 Operations Challenge. Special congratulations to the Pumpers who secured third place in the Process Control event. This is only the second team out of 42 teams representing Central States in the 21-year history of this competition to bring home a trophy. A phenomenal accomplishment considering that the team had just met and only had two practice sessions prior to the competition.

Forty-three teams consisting of more than 200 of the world's best and brightest wastewater treatment professionals competed in this year's unique, fast-paced skills competition for wastewater operations and maintenance professionals. Now celebrating its 21st year, the competition took place October 20-22 at McCormick Place in Chicago. As the largest water quality event in North America and largest annual water quality exhibition in the world, WEFTEC hosts more than 20,000 of the world's leading water quality experts and 1,000 companies featuring the latest in water quality technology.

Growing from an original 22-team event to its current 43-team, two-division format, each four-member team was judged on the best combination of precision, speed and safety. Winners were determined by a weighted point system for five events including collection systems, laboratory, process control, maintenance and safety. The events were designed to test the diverse skills required for the operation and maintenance of wastewater treatment facilities, their collection systems and laboratories



The Pumpers compete in the collection event.

— all vital to the protection of public health and the environment.

The main coordinator for the teams is Howard Jacobson, CSWEA Professional Wastewater Operators Representative. The Pumpers include Coach Rick Ashling, Albert Lea, MN; Captain Dennis Egge, Janesville, WI; Tracy Hodel, St. Cloud, MN; Ken Bloom, Marathon, WI; and Rob Barnard, Moline, IL.

The Shovelers are made up of Coach Jim Miller, Buffalo, MN; Captain Jeff Mayou, Marinette, WI; Paul Wilken, Duluth, MN; Lyle Lutz, Amherst, WI; Jim Huchel, Crystal Lake, IL.



Rick Ashling and Jim Miller place a bet.

These professionals competed against the best from around the United States and Hawaii to Canada and Argentina.

Paul Wilkins stated, "In a previous



life, I was involved in a number of team adventures, and rarely did I see people pull together as quickly as our two teams. This speaks volumes about the professionalism and just plain class of the people involved." Also quoted was Jim Huchel as saying, "It's not where you

work, but who you work with, that makes the job fun and fulfilling!"

Congratulations to everyone for being able to pull together so quickly and smoothly. This demonstrates the diversity, tenacity and teamwork potential of the people in the wastewater profession. **CS**



The Shovelers.



The Pumpers finish the process control event.



The Pumpers.

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# WEF's Young Professionals Construct a Rain Garden at WEFTEC '08



**C**SWEA helped sponsor a wonderful event as our YP leaders joined some 85 other YPs from around the country to construct a rain garden at Chicago's Pulaski Park. The Young Professionals project called "Getting out of the Gutter" was a fitting kick-off for WEFTEC '08. The project will both beautify the park and absorb rainwater runoff from roof gutters, minimizing contaminants that enter storm sewers and open water.

The rain garden event was a way to involve the community in the federation's mission, said Diane Crilley, WEF senior manager.

"They wanted to do a hands-on project at the same time we were holding the conference," Crilley explained. The Pulaski Park event included booths explaining how rain gardens function and another encouraging people to test their own water. Not only was the event great fun and satisfying to all involved, but it provided an awesome opportunity for WEF YPs from all over the country to unite for a common cause to improve water quality in this little city park. [CS](#)

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# WERF/WEFTEC '08 Golf Tournament

By Tim Tack & Eddie McCall

**W**EF held its annual golf outing associated with WEFTEC '08 at the George W. Dunne National Golf Course. Close to 80 golfers weathered the beautiful day to play 18 holes of golf. We would like to take this opportunity to thank all of those who signed up and played. This golf outing is a major fund raiser for the Water Environment Research Foundation (WERF) and helps ensure that important research on the water environment continues. All proceeds from the golf outing help support the efforts of WERF. Once again, on behalf of the WEFTEC '08 Local Arrangements Committee, we would like to thank all of you for your support and we look forward to doing it again next year at WEFTEC '09 in Orlando.

Thanks again to our sponsors, who are listed in alphabetical order below:

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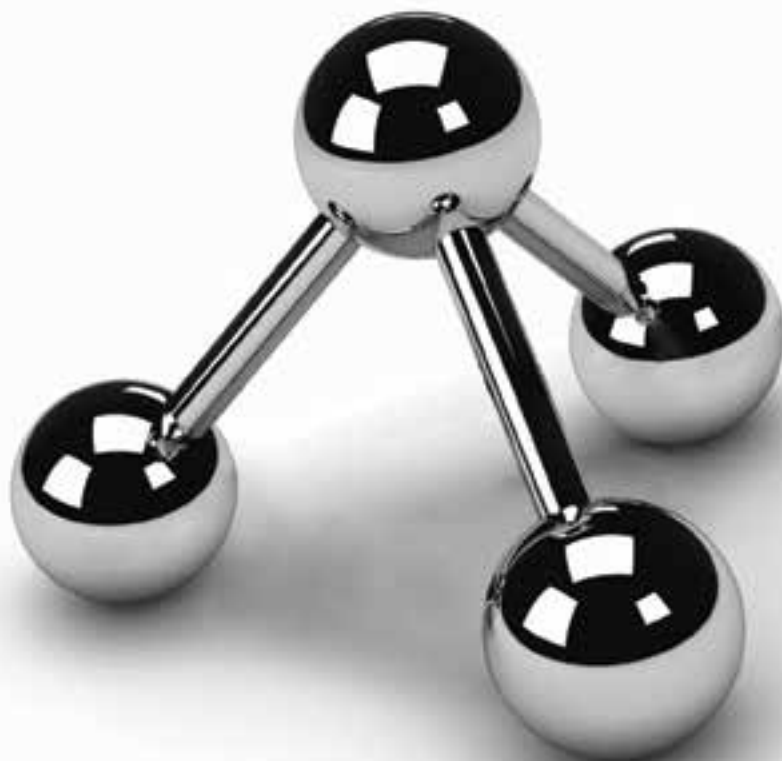
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# WEFTeach Seminar



By Greg Cargill

The 14th Annual WEFTeach held at this year's 2008 WEFTEC in Chicago was a smashing success. With more than 60 area science teachers attending, our environment and water quality messages should be reaching more than 5,000 new students in the coming year. At this year's event, the high school teachers were provided an overview of the Sewer Science module, a classroom-sized mobile wastewater treatment plant, and the middle school teachers were provided instructions on how to use the updated CSWEA/IWEA Ten-Day Water Environment Curriculum. Both groups were also provided overviews on the World Water Monitoring Day and Water for People programs plus information from the ISAWWA and the Stockholm Junior Water Prize; in addition, all teacher groups toured the WEFTEC Exhibition Hall.

The Local Arrangement Committee (IWEA and CSWEA) would like to thank Kendra Sveum, Greg Cargill, Robert Kulchawik, Jill Horist, Norm Rose, and Sam McNeilly for facilitating the WEFTeach break-out sessions; plus thanks to the numerous local volunteers for their

valuable contributions that made this event so successful.

Finally, we also want to thank our major sponsors of WEFTeach which included the Coca-Cola Company and MWRDGC. In addition, the following entities made it possible, with their sponsorship, for so many of the area sci-

ence teachers to attend this first-class event:

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An aerial view of a large wastewater treatment plant with several rectangular basins and a walkway. The water in the basins is dark and turbulent. There are trees and some buildings in the background.

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# Submit for a WEF Award

By Rusty Schroedel

There is still time to submit a nomination for one of the WEF awards, many of which will be awarded at WEFTEC '09 in Orlando. We often undervalue the important tasks we perform as part of our daily activities and I encourage you to stand up and be recognized. Below is a listing of the award opportunities. As a member of the national WEF Awards Committee, I can tell you that many awards have few or no nominations. It's time to brag a little bit about the accomplishments of our members. Please carefully review the various WEF awards available and nominate one of our many deserving members.

## 2008 WEF AWARD NOMINATIONS NOW BEING ACCEPTED

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

Further information on the above awards can be found at [www.CSWEA.org](http://www.CSWEA.org), [www.WEF.org](http://www.WEF.org), or by contacting Eric Lecuyer, 815-954-2714, [erlec@prodigy.net](mailto:erlec@prodigy.net)





**(Cut and return)**

Please complete the following information and submit to Rusty Schroedel at [rusty.schroedel@aec.com](mailto:rusty.schroedel@aec.com)  
Nominations must be received no later than January 1, 2009 for consideration as the Central States WEA Nominee for each award category.

Award Name: \_\_\_\_\_  
Nominee: \_\_\_\_\_  
Nominee Contact Information: \_\_\_\_\_  
Employer Name: \_\_\_\_\_  
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Please provide a brief description of your nominee's qualifications for the award: \_\_\_\_\_  
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Please provide your Name: \_\_\_\_\_  
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# Best From the INSIDE OUT



Left to right: Adam, Ken, Mike Gerbitz, PE, Donohue & Associates, Inc., Larry Reinke, Jennie-O Turkey Store, and Tom Asmus, formerly with Donohue & Associates, Inc. Mike Gerbitz was the Design Engineer, Larry Reinke is the operation manager and Tom Asmus was the operations specialist who provided startup services and training services. Tom Asmus is now the assistant superintendent with Marquette, Michigan.

The published article “Best From the Inside Out” was awarded the Gascoigne Wastewater Treatment Plant Operational Improvement medal at WEFTEC '08 and is printed in this issue of *Central States Water* with permission from WEF, where it was first published in the February/March 2007 issue of *Industrial Wastewater*. CSWEA member Ken Sedmak was a key author of the article, along with co-authors Mike Gerbitz, Larry Reinke and Tom Asmus.

**A**fter upgrading the wastewater treatment system at its Barron, Wis., facility in response to a new, stricter nutrient limit, Jennie-O Turkey Store (Willmar, Minn.) discovered that the change came with a pernicious filamentous

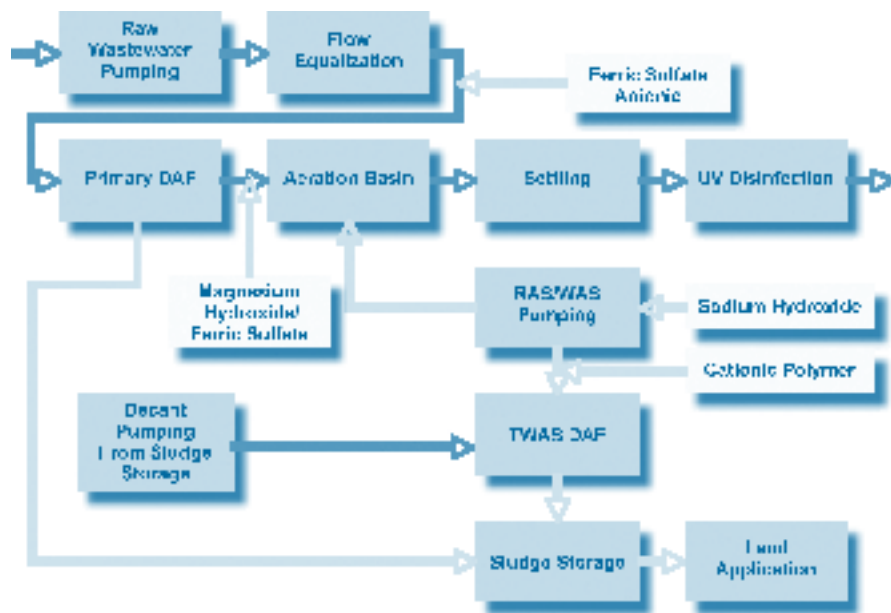


Figure 1: Process flow diagram

bulking problem. A lot of troubleshooting ultimately led the project team to a simple solution: Reverse the flow through the oxidation ditch.

## UPGRADE REQUIRED

The company has a 26,000-turkey-per-day slaughterhouse and packaging facility in Barron, Wis. Its wastewater is processed in a 4920-m<sup>3</sup>/d (1.3-mgd) treatment system before being discharged to the Yellow River.

In 2000, the Wisconsin Department of Natural Resources lowered the company's total effluent phosphorus limit to less than 1 mg/L. The existing treatment system — equalization, dissolved-air flotation (DAF) using ferric sulfate and anionic polymer, and an aerated lagoon with a seepage cell — could not meet this limit cost-effectively. The treatment system also had ongoing odor problems, so the company decided to replace it with an activated sludge system.

In the new treatment system, wastewater is screened before being sent to an equalization basin. After DAF using

ferric sulfate and anionic polymer, the wastewater is treated in an oxidation ditch, a secondary clarifier, and an ultraviolet light disinfection system before being discharged to the Yellow River (see figures 1 and 2).

This treatment system, which came on-line in June 2002, was designed for year-round nitrification and chemical phosphorus removal via ferric sulfate. Magnesium hydroxide provides supplemental alkalinity. The waste activated sludge (WAS) is thickened in another DAF tank, using a cationic polymer, and then all DAF sludge is sent to storage tanks. Three times a year, this sludge is mixed and then hauled to agricultural land-application sites. Meanwhile, decant from the storage tanks is pumped to the WAS DAF unit for solids removal. The underflow goes to the oxidation ditch.

The treatment system typically receives production wastewater from the slaughterhouse 5 days a week. The slaughterhouse facilities are fully disinfected on Friday night and Sunday night, and because of the long forcemain, both disinfectant

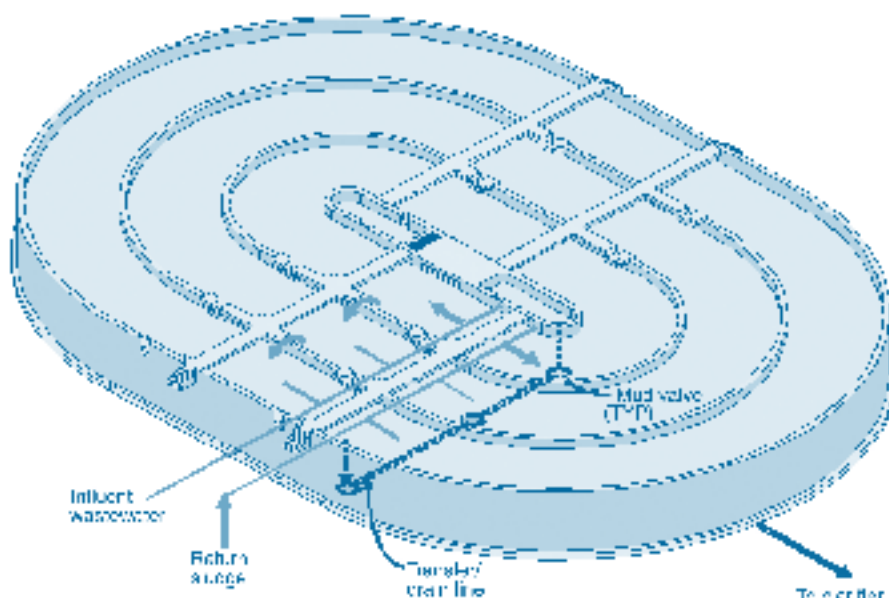


Figure 2: Oxidation ditch flow diagram

washes formerly entered the treatment system on Sunday evening. However, staff noticed that immediately after the activated sludge system started up each Monday, its flocs were dispersed, and effluent water quality was impaired. They suspected that the disinfectant was breaking up the sludge floc, so they began flushing Friday night's disinfectant wash to the treatment system on Saturday. This improved operations and effluent quality.

### KINKS, KINKS, AND MORE KINKS

The first year of activated sludge system operations was problematic because of equipment malfunctions, control issues, and slaughterhouse waste characteristics.

Dissolved-oxygen (DO) control, for example, was a major issue until the project team improved the electronics and cleaning frequency of the DO probes. Eventually, the team fixed all the equipment and control problems.

The slaughterhouse waste, however, was more difficult to address. It included highly soluble waste from turkey cooking, sludge storage decant, and disinfectants. Besides being toxic, disinfectants degrade slowly and can maintain a residual in the oxidation ditch. Splitting the disinfectant influent between Saturday and Monday helped minimize its effect.

Another problem was that the activated sludge system was plagued with recurring

filamentous bulking, resulting in high mixed liquor sludge volume indexes (SVIs) and periodically elevated effluent total suspended solids and biochemical oxygen demand (BOD) concentrations (see Figure 3, p. 27). The project team sent mixed liquor samples to an expert, who identified the predominant filamentous microorganism, O21N, which often thrives when hydrogen sulfide levels are high, nutrients are deficient, and organics are soluble and readily degradable.

The project team initially mitigated high SVI outbreaks by chlorinating return activated sludge (RAS). However, RAS could only be chlorinated by adding chlorine to the wet well of the submersible RAS pumps. This proved to be a difficult method of effectively controlling filaments and led to effluent quality problems because of high SVIs in May and June 2003.

Team members began investigating potential causes of O21N growth. They found that sulfide levels in the oxidation ditch were low (and so not a concern). They determined that ferric sulfate added to oxidation ditch influent (to remove phosphorus) could be making the ditch phosphorus-deficient, so they moved the ferric sulfate addition point to the ditch effluent overflow box (just before mixed liquor flows into the secondary clarifier). This did not affect O21N bulking. The team decided that elevated concentrations of soluble, readily biodegradable organics (the result of turkey meat processing) were the cause of the O21N outbreaks.

### ANOTHER OPTION NEEDED

Unfortunately, high concentrations of soluble, readily degradable organics quickly disperse throughout an oxidation ditch, resulting in a low bulk food-to-microorganism ratio (F:M). In fact, low F:M values combined with soluble, readily degradable organics promote O21N and other filaments — according to the *Manual on the Causes and Control of Activated Sludge Bulking, Foaming, and Other Solids Separation Problems*, written by David Jenkins, Michael G. Richard, and Glen T. Daigger — because these organisms have more surface area than “floc formers” (smaller, good-settling bacteria) and are more likely to contact and metabolize the soluble substrate. During the first year of operation, the oxidation ditch's F:M typically was less than 0.15 lb BOD per pound of mixed

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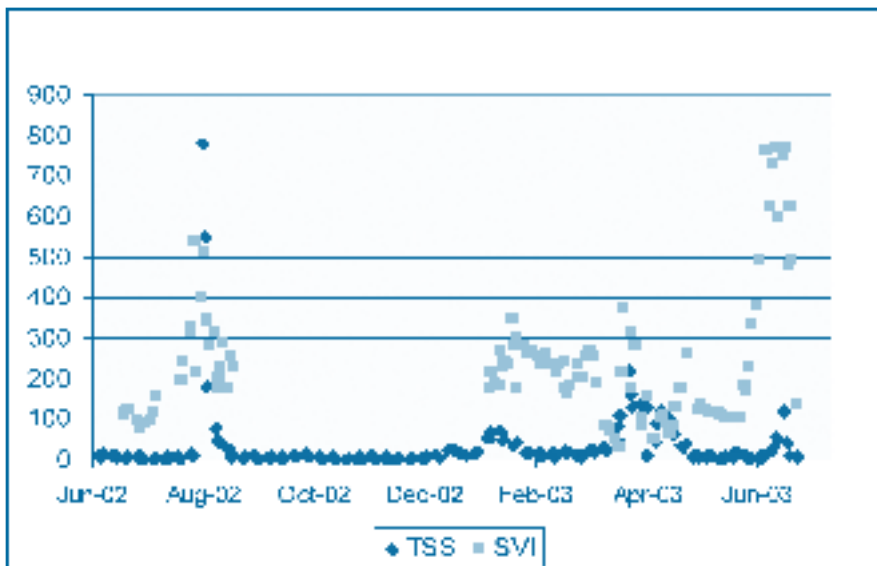


Figure 3: TSS and SVI levels between June 2002 and June 2003

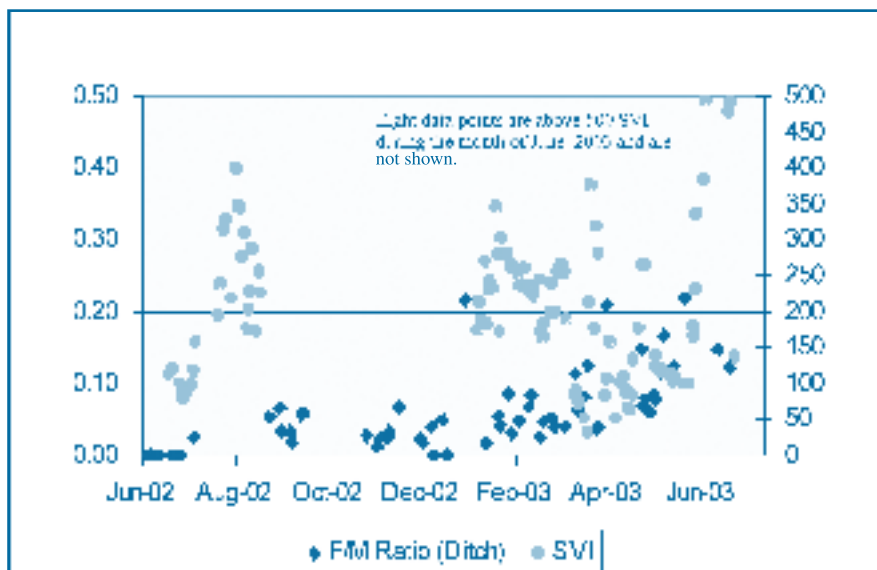


Figure 4: FM ratio and SVI between June 2002 and June 2003

liquor suspended solids per day, and its SVIs were usually more than 200 mL/g (except after RAS chlorination episodes; see Figure 4, page 27).

Providing high F:M selector zones upstream of such tanks can overcome this problem. However, the company considered this option a last resort because of the time and money required to design and build the selector. Team members considered other options, including ongoing RAS chlorination and partitioning the oxidation ditch. They concluded that RAS chlorination should only be a backup method. A selector was the best option. To ensure that RAS chlorination would be effective, however, the team decided to design and build a mixed liquor chlorination system as backup.

Initially, team members focused on partitioning approximately 1900 m<sup>3</sup> (0.5 million gal) of the ditch's outer ring to achieve a selector F:M in the range of 0.7 to 1.0 lb BOD per pound of mixed liquor volatile suspended solids per day. But then they noticed that its inner ring nearly matched the desired selector volume.

Fortunately, all three rings in the oxidation ditch had influent and RAS feed points, as well as transfer lines to the clarifier inlet pipe, so the project team decided to change the wastewater feed and return sludge from the outermost ring to the innermost ring to make the inner ring an aerobic selector. The team reversed mixed liquor flow, so it now went from the inner ring, to the middle, to the outer, and then to the clarifier via drain lines and transfer pipes. The drain valves created hydraulic limitations, but the team decided to ignore that while testing whether the reversed flow could provide selector benefits.

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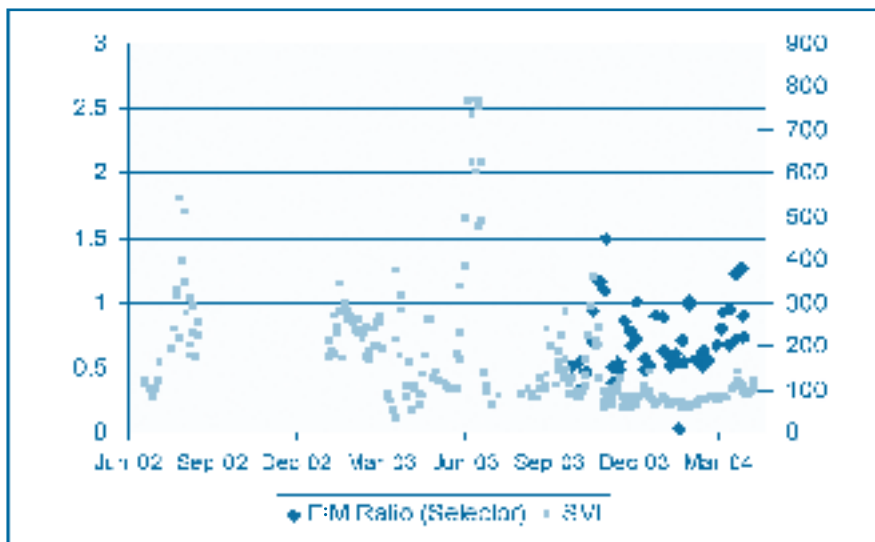


Figure 5

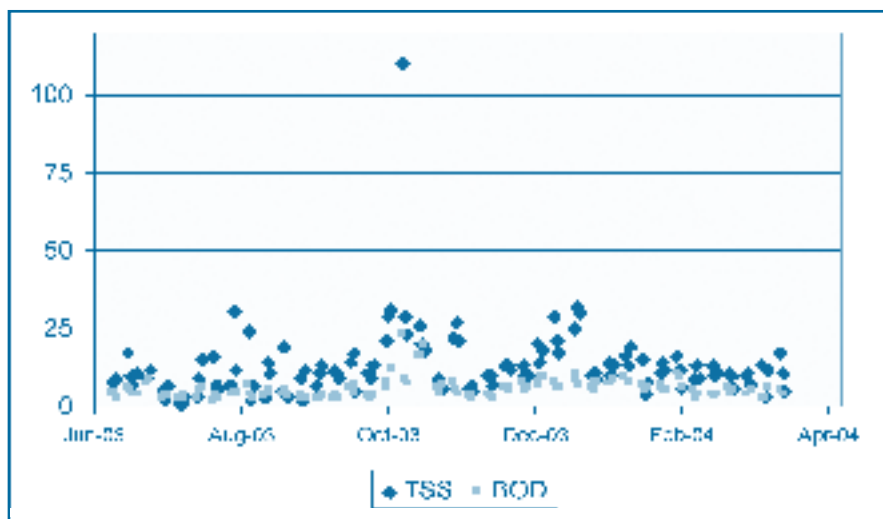


Figure 6

## REVERSAL WORKS

Reversing flow in the oxidation ditch minimized filamentous bulking and significantly improved mixed liquor settleability (see Figure 5, page 28). After several months of operation, SVI stayed at about 100, and the F:M in the inner ring selector was typically between 0.5 and 1.0 lb BOD per pound of mixed liquor volatile suspended solids per day.

The project team assessed the level of soluble BOD uptake in the inner ring (the "selector effect") by analyzing the soluble BOD concentration in inner ring effluent. To do this, they took samples of mixed liquor at the point where it overflows from the inner ring to the middle and immediately filtered it through a paper towel in a colander. The filtrate was quickly transported to the laboratory, where analysts filtered it through a fine glass-fiber filter before doing the BOD test. Results indicated that soluble BOD was at or below 20 mg/L, indicating that the majority of it had been removed.

Effluent quality results from June 2003, when the inner ring selector was placed into operation, through April 2004 are shown in Figure 6 (at left). RAS was chlorinated in October 2003, but since then, RAS chlorination has been minimal.

Now that the company knew the inner ring could be an effective selector, the project team installed an effluent overflow box on the outer ring, so mixed liquor could flow directly from the overflow box into the clarifier. They could then shut down the transfer pipe and its associated drain valves, eliminating the associated hydraulic flow restriction.

## GO WITH THE FLOW

Since the selector has been in operation, O<sub>2</sub>IN has been controlled, SVIs are low, and effluent quality has been maintained within all permit limits. Other oxidation ditch systems that are treating wastewaters with significant soluble, readily degradable organics and that have filamentous bulking problems should consider reversing the flow to achieve a similar benefit. **CS**

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# Midwest Water Industry Expo

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**T**hank you to everyone who has made the first three years of this show a HUGE success. We are proud to offer the expo for a fourth year. We are back to our original location at the Kalahari Resort & Convention Center in Wisconsin Dells. We are now accepting vendor registrations for the 4th Annual Midwest Water Industry Expo. Floor space is limited, to ensure the space you need, please register as soon as possible.

The date of our expo gives you a chance to have a weekend getaway at a premiere Wisconsin holiday resort in February as well as get informed on many products and companies.

**Exhibit hours: Tuesday, February 10,**  
9:00 a.m. to 6:00 p.m.  
(Happy Hour 3:00 to 5:00 p.m.)  
**Wednesday, February 11,**  
9:00 a.m. to 2:00 p.m.

**Exhibit set-up: Monday, February 9,**  
time to be determined

**Room rates:** \$99/night (includes four water park passes)

## Highlights of the exhibition area:

- Continental breakfast and lunch in the exhibition area on Tuesday and Wednesday.
- Exhibition area reception (Happy Hour) on Tuesday.
- 30-minute vendor talks held directly outside the exhibition area.
- Raffle prize drawing on Tuesday and Wednesday (major prize duplicated for each night).



## Reasons to exhibit:

- Exhibit only expo, no competing technical sessions.
- Bring your family along for the fun at the water park (four water park passes included per room).
- Your colleagues will be there.
- Discounted room rates available Monday through Friday night.
- 30-minute vendor talks available.
- Midwest region attendance.

Sponsorship of the reception (Happy Hour) is encouraged at \$35 a firm. This fee will also be applied to the continental

breakfast we will have available for all attendees and vendors.

We appreciate your consideration to exhibit at the Expo. If you have any questions, please contact someone from the planning committee listed below. We look forward to seeing you there! CS

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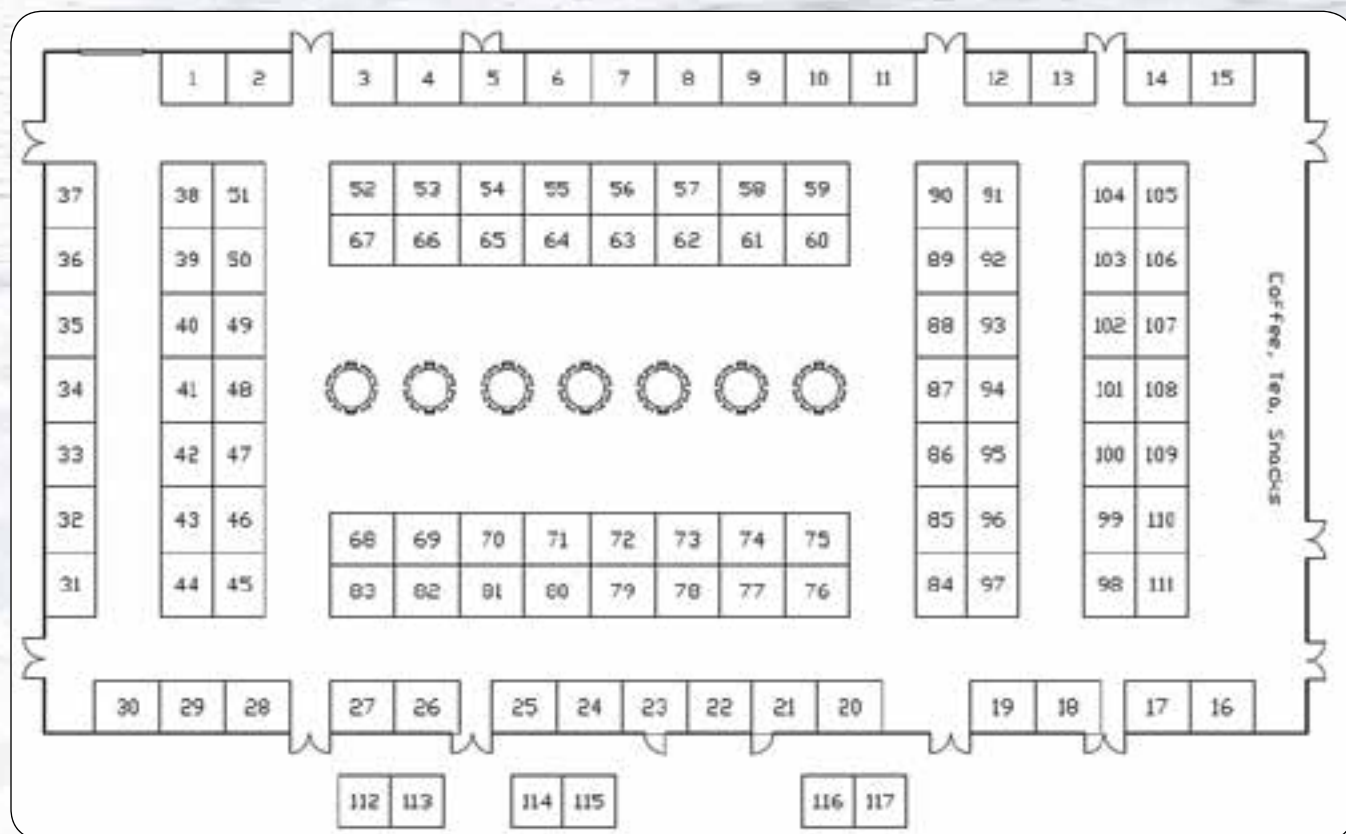
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# 10 Rules for a Successful Trade Show

A lot of effort goes into exhibitors achieving success at a trade-show. This effort must be expended before the show, during the show and after the show. Here are 10 rules to follow to get that success.

## 1. SET ACHIEVABLE GOALS.

First, ask what it is you want your display to accomplish. Are you after leads, sales, the chance to introduce a new product or service, or simply just to keep your company's name in front of potential customers? Once you have determined your goals, plan other aspects of your booth (theme, layout, product displays, giveaways, literature, etc.) with them in mind.

## 2. READ THE EXHIBITOR HANDOUTS/MANUAL.

The exhibitor handouts/manual will provide you with pertinent information such as show schedule, registration, electrical service, floor plans, shipping and freight services, housing information and advertising. The specific information will vary depending on the show.

## 3. PLAN GRAPHICS EARLY.

Planning your booth's graphics early reduces stress for everyone concerned and ensures that the finished product is what was originally envisioned.

## 4. PREPARE THE BOOTH STAFF.

Trade shows (large and small) are very demanding in terms of time, energy and cost. Too often, the booth staff are totally ignored and simply told where and when to show up. These staff members are your company's representatives, its ambassadors. They must be briefed prior to the event, told of the company's aforementioned goals and what is expected of them. You expect them to act professionally during the trade show, so be professional in preparing these individuals for the show.

## 5. FIND OUT THE VISITORS' NEEDS AND TRY TO MEET THEM.

Avoid having your staff members deliver a common script to all visitors who stop at your booth. Remind them that they have

one mouth and two ears for a reason. Ask the right questions and then listen carefully to the responses. It is important to find out why the visitor has stopped at your booth. Once that has been determined, your booth staff member can go about trying to meet that need to the best of his/her ability.

## 6. LITERATURE AND GIVEAWAYS ARE EXTRAS, NOT THE END-ALL AND BE-ALL.

Ensure that your booth staff members hand out literature and giveaways along with their discussions with visitors, and not instead of, those discussions. Too often, booth personnel think they have done their job simply by handing out a bag of goodies. This is the wrong approach to take as nothing concrete comes out of it.

## 7. BOOTH STAFF MUST BE FAMILIAR WITH MATERIAL AND DEMONSTRATIONS.

In your pre-show preparation of staff members, ensure that they are familiar with what is on the video presentation, know how to work the equipment, and can perform the demonstration. A well-prepared show-and-tell comes off as being very professional. The opposite is also true.

## 8. SCHEDULE BOOTH STAFF ACCORDINGLY.

Too often, a company displaying at a trade show has a glut of personnel around the booth. These colleagues spend all their time socializing with one another rather than with the trade show visitors. Draw up a booth staff schedule and insist staffers stay away from the booth until their scheduled time. Assign specific tasks so everyone knows why they are there.

## 9. FOLLOW UP THE LEADS.

Set a method and a deadline as to how and when you and your staff should complete the follow-ups on the leads generated at the show. The longer these leads are left unattended, the colder they become.

## 10. EVALUATE THE TRADE SHOW AS A BUSINESS EVENT.

At a meeting immediately following the event, determine if the pre-set goals were met. Evaluate the performance of your company/booth/staff and discuss how there could be improvement for the next trade show.



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## PLANT PROFILE

# Village of Sussex Wastewater Treatment Facility

*CSWEA Operations award-winning facility  
for Wisconsin at the 81st Annual Meeting*

By Tom Foltz

**T**he Village of Sussex has an enviable tradition of providing the required wastewater treatment resources for its citizens and neighboring municipalities. Sussex built its first Wastewater Treatment Facility at the current site in 1959. At that time the facility was designed for an average daily flow of 0.3 mgd, and had a construction cost of \$163,000. New facilities were constructed in 1978 and 1994 to treat average daily design flows of 1.0 mgd, and 3.2 mgd, respectively. The respective construction costs for those two projects were \$2,600,000 and \$9,800,000. The 1994 regional treatment plant was recently upgraded to ultimately treat average and peak daily flows of 5.1 mgd and 17.0 mgd. The construction cost for the recently completed upgrades is \$6,691,000.

The 5.1 mgd regional facility serves the Village of Sussex, Village of Lannon, Lisbon Sanitary District No. 1, and a portion of the Village of Menomonee Falls. All influent wastewater is screened through a mechanically cleaned bar screen and pumped to further treatment. Under normal operating conditions, all influent flow will receive grit removal through vortex grit units and flow to the oxidation ditch activated sludge system. Anthracite media tertiary gravity filters follow the secondary clari-

fiers, and plant effluent is seasonally disinfected using ultraviolet light (UV) disinfection. All flow is metered and discharged through a step aerator to Sussex Creek; blowers and aeration diffusers are available for effluent aeration during high water events. Under extreme conditions, a small fraction of the flow may be diverted from the influent pumps directly to the oxidation ditch activated sludge system and around the tertiary filters to the UV disinfection system. Ferric chloride is added for phosphorus control. Liquid biosolids are gravity thickened and hauled from the plant and land-applied.

The treatment facility is designed to handle daily loads of 6170 lb BOD, 7230 lb TSS, 1360 lb TKN, and 150 lb of phosphorus. Monthly and weekly seasonal effluent BOD limits are 10 and 5 mg/l respectively for November to April and May to October. Monthly and weekly average TSS limits are 10 mg/l year round. Average effluent ammonia limits are variable year round and range from 1.9 to 5.0 mg/l (monthly) and 4.8 to 12.5 mg/l (weekly). Phosphorus must be controlled at 1.0 mg/l, and fecal coliform must be controlled to 400 col/100 ml. Effluent pH must be between 6.0 and 9.0, and effluent dissolved oxygen must be above 7.0 mg/l.





The recently completed modifications include renovation and upgrading the existing VTSH influent wastewater pumps with additional variable frequency drives, addition of a third vortex grit removal unit, two additional Orbal oxidation ditch shafts, a third secondary clarifier, new tertiary filter troughs, UV disinfection, a second biosolids storage tank, new septage receiving and debris dump stations, a second engine generator, and a new plant supervisory control and data acquisition system (SCADA) that also monitors 16 remote pumping stations. The influent wastewater pumps are run faster with smaller impellers to increase pumping capacity; submersible pumps may be used in the future. Full radius skimming was added to the new clarifier and to the two existing clarifiers. The new engine generator serves the new Orbal shafts and the UV disinfection system. The new SCADA system employs Wonderware operator interface software; radio communication with the remote pumping stations has solved a host of operating issues. The new and existing biosolids storage tanks are equipped with submersible pump decant systems that are very effective at increasing the gross solids concentration in the tanks.

Plant staff, Gerry Spengler, Dennis Wolf and Jon Bauman, are led by Superintendent Jim Thalke. Strand Associates designed the plant modifications, and C.D. Smith Construction was the general contractor. Staff Electric Company, A. Warp Mechanical, and Spies Painting completed electrical, mechanical, and painting improvements.

The renovated facility is planned to provide treatment capacity through the year 2025. The existing site has adequate land area for a duplicate treatment facility of approximate equal capacity. [CS](#)



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# Focus on Energy – Water and Wastewater Energy Savings

By Joseph C. Cantwell

**WISCONSIN'S FOCUS ON ENERGY WORKS WITH THE WATER AND WASTEWATER INDUSTRY TO INCORPORATE ENERGY EFFICIENCY INTO ALL DESIGN OR FACILITY MODIFICATIONS – RESULTING IN SUBSTANTIALLY REDUCED ENERGY CONSUMPTION FOR MANY COMMUNITIES.**

In October 1999, Focus on Energy was formed “to encourage energy efficiency and use of renewable energy, enhance the environment, and ensure the future supply of energy for Wisconsin.” As the Focus on Energy program developed, the water and wastewater (W/WW) industry emerged as a sector with great potential for energy saving opportunities. The simple fact that these facilities operate continuously increases their potential over that of similarly sized industrial operations. Subsequently, the Water and Wastewater program was formed in 2000.

Private treatment facilities for industries as well as W/WW facilities regulated by the Wisconsin Department of Natural Resources are eligible for program participation, which is completely voluntary. The Department of Natural Resources has approximately 1,200 active industrial and municipal wastewater discharge permits and 1,180 potable water supply facilities under its authority. These facilities range from small systems serving rural communities to large metropolitan facilities faced with treating high volumes of municipal and industrial wastewater.

The majority of program participants have been municipal facilities charged with meeting the needs of the communities they serve while complying with the code requirements that govern their operations.

## **WATER/WASTEWATER PROGRAM AT WORK**

Basic program services, such as facility surveys and preliminary energy assess-

ments, have been provided at no cost to participants. The W/WW program energy surveys familiarize administrative and operations personnel with their facility's energy bill and how the facility uses energy. The survey also identifies energy saving opportunities in an assessment report. The report helps W/WW personnel assess which opportunity to move forward to their board for approval to implement.


The only way to realize consumption reduction and potential cost savings is to implement energy-efficient practices and/or the installation of energy-efficient equipment. Cost share funding was made available through the program for qualifying projects to offset the expense of detailed studies and implementation, but facilities have never been obligated to pursue any projects identified by the program staff. The program also provides education and training courses and distributes informational materials describing new, energy-efficient technologies.

The Focus on Energy program has been active in assisting many W/WW systems in identifying, assessing and

implementing energy efficiency projects. Many modifications have involved aeration systems (blowers, fine bubble diffusers, dissolved oxygen monitoring and control), pump systems (proper application, variable speed drives, assessment of complete system, proper sizing of conveyance system), lighting, heating, and solids management (aerobic and anaerobic digestion).

## **SIGNIFICANT SAVINGS**

Proactive and progressive facilities that have participated in the program are recognizing the potential savings available (generally 20 percent to 30 percent, up to a possible 70 percent).

Nearly every facility has energy efficiency opportunities. You can become proactive and identify and implement the savings your facility has available. To assist you in moving forward, utilize the Water/Wastewater Energy Best Practice Manual developed by Focus on Energy. The manual is available at <http://www.focusonenergy.com/Business/Industrial-Business/Guidebooks/default.aspx> 



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# Public Infrastructure Investment





# Makes \$ense



By Bill Bertera,  
Executive Director, Water  
Environment Federation

Infrastructure investment is back in the national news. Usually when this happens it is the result of some dramatic infrastructure failure like a bridge collapse, but this time it is a bit different. The global economy is under stress and economists and politicians alike are looking for quick fixes. They are looking for precedents and finding them in the policies of Franklin Roosevelt, Dwight Eisenhower and Richard Nixon – they are eyeing investments in public infrastructure. Experts might also look to the Japanese experience in the 20 years since their economy experienced a dramatic meltdown for some answers. The power of infrastructure investment in reviving failing economies is impressive.

Even the presidential candidates talked about it. The reasons are simple: public spending on public infrastructure works. It works because state and local governments will spend everything they get and spend it quickly. They already have significant inventories of public works projects (including water and sanitation initiatives) awaiting funding, which makes it puzzling why infrastructure investment is not receiving more immediate attention at the federal level.

The answers are as simple as they are disturbing. Except for the highly visible highway and airport infrastructures (and

even they are in trouble), most infrastructure is not politically “cool”. It is expensive, it takes a long time to complete (often longer than the terms of office of those who need to vote the funds) and importantly, it is frequently seen to come at the expense of critical social services for the people most in need in our society.

And there is one other problem – federal infrastructure investment at the local level involves income redistribution, taking money from those who have invested in their infrastructure at some sacrifice and making them pay for communities that could not or chose other priorities. These are all deal killers except in the most abundant of times, but that does not make infrastructure a bad public policy decision for America.

Ten years ago abundance seemed imminent and there was a raging national discussion about how to spend what was

anticipated to be a huge national budget surplus, and all sorts of infrastructure projects were on the table, including water and sanitation elements. The surplus never materialized and neither did the infrastructure investment. But the need remains in almost every area of public infrastructure investment.

What did materialize in the water and sanitation field was the funding gap, the literal billions of dollars between what was being spent and what would be needed over the next 20 years just to stay even as aging infrastructure and population growth took its toll. Despite very aggressive investment initiatives in hundreds of communities in water and sanitation infrastructure, the national gap, estimated by the EPA to be in the \$478 billion range, remained. This was despite annual local government investments in water infrastructure in the \$30 billion range

“In the United States, federal investment in infrastructure is less than 3% of GNP. In the 1950s, that share was in the 10% range. It has been going down ever since.”

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in recent years. The gap remains and is growing and private investment capital is not filling the void.


A recent study by the United States Conference of Mayors suggests that the return on investment for every dollar spent on water infrastructure is \$2.62 in that year and for every job added in water and sanitation, 3.68 jobs are created in the national economy to support that job. We also know that federal funds put into the hands of state and local officials actually get spent, and usually quickly. And there are some preliminary indications in Congress that there is a need to at least pretend to be taking the situation seriously.

Congress does this by drafting and proposing legislation. But drafting and proposing are a far reach from actually enacting and there seems little political will to do that in an election year with a recession looming. That does not stop legislators from talking about it, however, and letting us think that something will happen.

“Local public infrastructure is a matter of national interest and priority, or at least it should be.”

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“ The private sector would have us believe that all that is necessary is to enable the wholesale privatization of public infrastructure and the gap would go away. ”

The case for infrastructure investment in general is well known and documented. Those who own homes know how it works. Eventually everything wears out, but it wears out more slowly if it is taken care of along the way. Doing so not only prolongs the life of the asset but allows us to extract as much value from it as possible while giving us time to save for the day when maintenance gives way to necessary replacement. Why is it that we understand that with respect to our homes, but not our ports, rivers, parks, and water and sanitation infrastructures, to name but a few examples?


The answers are uncomplimentary to Americans as a people and reflect a short sightedness and absence of what political scientists used to refer to as “public regardness”, the willingness to give up personal and immediate satisfactions for a longer term public good that benefits the whole of society rather than just us. The analogy of a rising tide raising all boats is apt here.

Our deficiencies in just about every area of public infrastructure investment have been documented by the American Society of Engineers in its annual infrastructure investment report card. In the United States, federal investment in infrastructure is less than 3% of GNP. In the 1950s, that share was in the 10% range. It has been going down ever since. By some estimates, the funding gap for all

public infrastructure is in the area of \$1.6 trillion over five years, and water and sanitation are a big piece of the gap nationally.

The argument is often made that water and sanitation infrastructure are and should be local responsibilities and they are. But it is also clear that if local governments were able to meet all their needs, there would not be a national funding gap. The private sector would have us believe that all that is necessary is to enable the wholesale privatization of public infrastructure and the gap would go away. The experiences of Europe, South America, and Asia suggest otherwise.

Local public infrastructure is a matter of national interest and priority, or at least it should be. Our economy, our competitiveness and even our security as a country depend upon the strength of our infrastructure and what it lends to every aspect of what we call our quality of life. The sum total of our national experience is the sum of our parts – the states and local governments where everyone lives, where all tax dollars are generated and most spending occurs, should be a national priority.

In this context, all infrastructure is important for economic development, security and quality of life. But water and sanitation infrastructure are critical for life itself – that should count for something. 



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## PLANT PROFILE

# City of Owatonna

By Dean Nelson

Clean water has always been a priority for the City of Owatonna. The city's sanitary sewer system dates back to 1916, although it was not until 1940 that the first wastewater treatment facility was constructed. The facility was expanded in 1961 and planning for Owatonna's newest wastewater treatment plant began in the early 1970s the new \$17 million facility began treating wastewater in December 1987.

The treatment plant was constructed on an abandoned landfill necessitating the excavation of 100,000 cubic yards of refuse which was transported to and safely deposited in the Steele County sanitary landfill.

Raw wastewater entering the pumping station is metered and then screened to remove rags, sticks and other objectionable materials. After screening, wastewater is pumped by three 3,000 gallon/minute and one 1,200 gallon/minute pumps to the treatment units located above ground. Removal of sand and grit from the wastewater is accomplished in an aerated grit tank. Twin 250 gpm pumps, specially designed to withstand the abrasiveness of the grit slurry, pump the mixture to a grit separator and washer from which it is eventually hauled to the sanitary landfill.

Twin 65-foot diameter primary clarifiers provide conditions to settle suspended solids from the wastewater. The settled sludge is collected and pumped by three 90 gpm air-operated diaphragm pumps to the sludge processing facility at the plant.

The heart of the treatment process consist of four aeration basins each measuring 180 feet long by 32 feet wide and containing 15 feet of liquid. Air is injected into the tanks by a grid of 5,000 ceramic diffusers creating fine bubbles for gentle mixing and providing oxygen to the micro-organisms. Two 85-foot diameter final clarifiers covered with aluminum geodesic domes provide for solids separation. From the clarifiers, wastewater flows into six gravity sand filters where a four-foot bed of sand removes remaining particulates in the waste stream. The filters are



periodically cleaned by backwashing them with plant effluent to remove accumulated debris. Dual chlorine contact tank provides the proper detention for chlorine to kill harmful bacteria prior to discharging the effluent to the Straight River. Sulfur dioxide is added at the end of the tanks to eliminate the chlorine residual to further protect aquatic organisms.

The sludge processing facilities consist of a 60-foot diameter primary digester with a fixed steel cover and two mechanical

mixers, a 60-foot diameter secondary digester with a floating gas holding cover that provides for storage of the methane gas. This methane is collected and burned in an engine/generator which helps offset operating costs. There are also two biosolids holding tanks on-site with a total capacity of 1.7 million gallons.

Plans are being made at present for an upgrade to include phosphorus removal and biosolids handling improvements. [CS](#)

The existing plant design summary is as follows:

Flow	5.0mgd	TSS	7800 lbs/day
BOD	8500 lbs/day	NH3-N	900 lbs/day

NPDES Permit Conditions:

BOD5:	5 mg/l
TSS:	30 mg/l
Ammonia N	1.5 mg/l

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# Nutrient Removal: *How Low Can you Go?*

**Plan on attending the Education Seminar April 7, 2009 in Madison, WI to learn the latest about nutrient removal regulatory trends and technology.**

**M**any of you may remember when secondary treatment was standard performance for wastewater treatment plants. High level removal of BOD and suspended solids was the mandate and the improvement in water quality around the country was dramatic. Now many of these same treatment plants are expected to do more as effluent limits are driven by water quality standards and not simply technology. Secondary treatment is an example of a technology-based standard, but technology-based standards are giving way to water quality-based effluent limits in many states and this is occurring here in the Central States of Minnesota, Illinois and Wisconsin.

New effluent standards for nutrients, meaning nitrogen and phosphorus, are at the forefront of the water quality-based effluent limits. Nutrients impact water quality by stimulating primary production in the aquatic environment, such as algae and other plant growth. Nutrients can accelerate eutrophication and negatively impact water quality by reducing dissolved oxygen through die-off of algae. The impact of nutrients is most acutely observed in lakes and reservoirs.

In the Midwest, the limiting nutrient is considered to be phosphorus, so the first efforts at water quality-based effluent limits



have been for phosphorus. The theory being that if phosphorus is controlled, the growth of algae can be limited.

Phosphorus concentration in treatment plant effluent discharges to the Great Lakes have been limited to 1.0 mg/L since the mid-1970s through an international agreement between the Great Lakes States and the Province of Ontario. The limit of 1.0 mg/L was believed to be technically and economically feasible at that time. Wisconsin instituted a statewide phosphorus limit of 1.0 mg/L in the late 1990s.

The current method of calculating water quality-based effluent limits compares the ambient concentrations in the receiving water to the water quality standard. In many cases the receiving water already exceeds the water quality standards. Wisconsin has initially proposed phosphorus effluent limits equal to the ambient water quality standard, for example, 0.1 mg/L for large streams and 0.075mg/L for small streams. Wisconsin is beginning to turn its attention to lakes with the likely result of equally stringent limits emerging. Minnesota has implemented some reduced (less than 1.0 mg/L) phosphorus limits for some specific discharges to lakes. Illinois is developing their approach to water quality-based phosphorus limits.

Water quality-based effluent limits for phosphorus are controversial for several reasons:

1. The contribution of non-point sources, especially agricultural runoff, to nutrient loading in the environment is generally greater than point sources. Yet no comparable efforts to control non-point sources have been promoted.
2. As presently conceived, there are no exceptions to water quality-based limits, so small dischargers are faced with the same limits as larger dischargers, regardless of economic impact.
3. The new limits will result in a significant public investment, but without parallel non-point controls will the yield of this investment be significant water quality improvement as was gained by the secondary treatment standards and ammonia limits, for example.

Areas of the country with sensitive watersheds are currently dealing with these extremely low limits including the Chesapeake Bay region, many parts of Florida, Lake Tahoe (Nevada), Colorado, Oregon and New England. Discharge limits on nitrogen as



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well as phosphorus have been implemented. The industry is once again asking the question: What are the limits of technology (LOT)?

I attended a workshop at WEFTEC '08 in Chicago that explored this issue with presentations by the managers of treatment plants that are currently meeting effluent phosphorus discharge limits standard as low as 0.08mg/L. The premise of the workshop is that treatment plants are operating at or near the limits of technology for both phosphorus and nitrogen, so how low can plants reliably operate.

The WERF workshop sought to answer the following questions based on the case studies presented:

1. To what extent can existing technology (at operating plants) achieve low effluent limits with respect to nitrogen and phosphorus?
2. What are rational statistical bases for permit writing for LOT effluents?
3. To what degree does regional climatic difference influence performance?
4. What can be done to improve reliability?
5. What plant features ease operator's tasks?

For phosphorus removal the case studies involved a variety of process modifications including:

- Bio-P/Chemical/Tertiary Filters
- Bio-P/Chemical/Tertiary Solids
- Contac clarifiers
- Multi-point chemical addition/
- Tertiary filters
- Chemical with tertiary ballasted sedimentation/filters

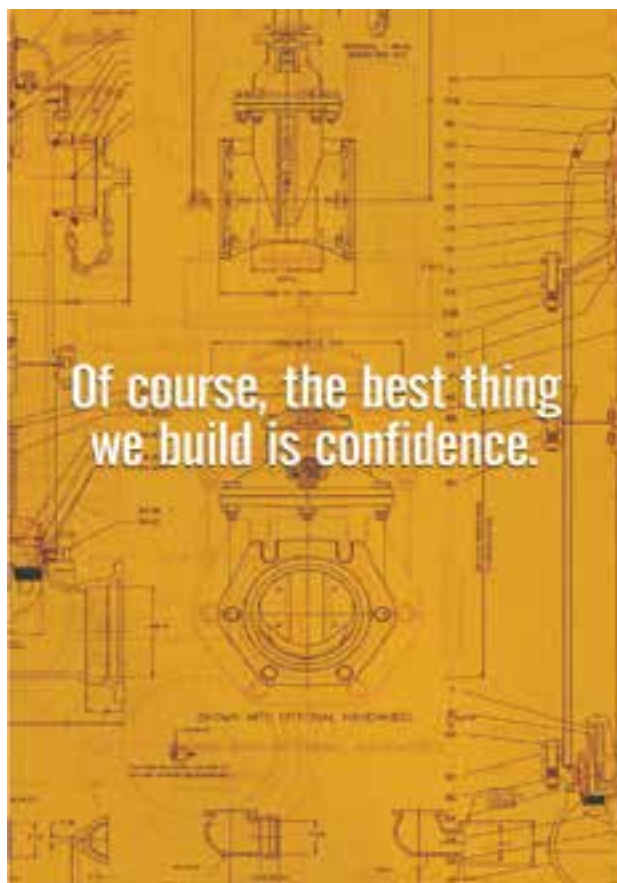
Chemical addition/membrane bioreactor (MBR)

A common theme of the managers of these plants was obvious pride at producing high-quality effluent and the stress of having to meet such stringent limits at the edge of what the technology is capable of. The performance of these plants was very impressive but the public investment in these advanced technologies was also significant.

The table below compares effluent data from three plants with the average calculated three different ways. Clearly regulating on the annual rolling average provides the operator more flexibility and impacts the way the design engineer approaches reliability criteria.

Plant	Daily Data	Rolling 30-day Average	Monthly Average	Annual Rolling Average
Clark Country, NV	0.200	0.157	0.151	0.109
Rock Creek, OR	0.210	0.174	0.151	NR, dry months only
Blue Plains, DC	0.180	0.158	0.161	0.106

The bar graph on page 49 shows how reliability dramatically declines as phosphorus limits become more stringent (TP = total phosphorus; OP = ortho phosphorus). Is there truly a water quality benefit by regulating at the limits of technology, if the



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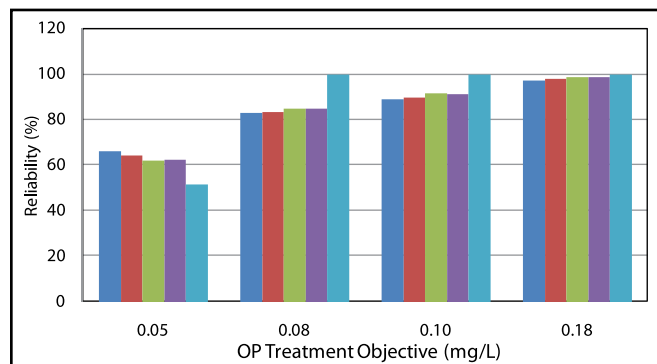
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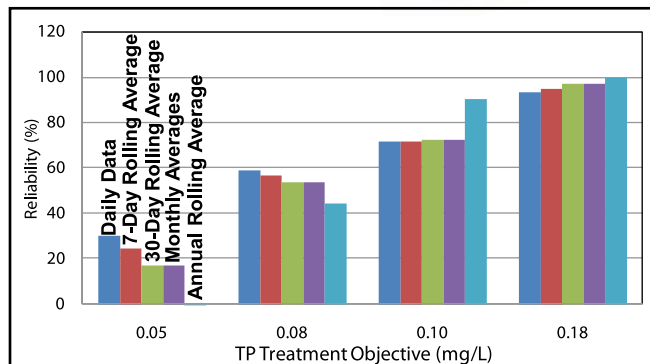
reliability suffers? It would seem to make more sense to regulate in a manner that ensures success rather than guarantees violations.

The workshop provided some recommendations for permit writing to meet water quality objectives while recognizing the inherent variability of the treatment processes:

1. Permits based on median values are more consistent with the typical probability distributions of effluent data.
2. Extend the averaging period over a greater time frame: monthly or annual.
3. True mass load limits (with monthly or annual concentration-based limit).



The WERF Workshop showed that meeting low limits for nutrients is possible for municipal wastewater treatment plants. As these requirements make their way to Illinois, Wisconsin and Minnesota, resources such as WERF will be valuable to plant managers and operators, regulators and design engineers.



The 2009 Education Seminar will be held at the Monona Terrace in Madison, WI on April 7, 2009 and will focus on nutrient removal. [CS](#)



Submitted by  
Jay Kemp, PE

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# WisWARN is now OPERATIONAL



By Dan Thompson, Executive Director of the League of Wisconsin Municipalities

**D**isasters can strike our communities at any time and without much warning. Police and emergency medical responses are key, of course, in the first few hours following a disaster. Rebuilding our communities after a disaster, however, takes more than squad cars and ambulances. It requires sound public services, starting with drinking water and wastewater treatment.

When disaster shuts down the water treatment plant or the sewage treatment plant, a community loses the ability to repair itself, so getting those plants back online is a top priority for local officials. In order to make disaster recovery easier, faster, and more effective, a group of dedicated local officials have created WisWARN, the Wisconsin Water/Wastewater Agency Response Network.

Water and wastewater agencies can use the WisWARN network to locate personnel, equipment, and materials in times of emergency. It provides rapid, short-term deployment of emergency services to recover from any emergency, including natural disasters like tornados,

floods, ice storms, and earthquakes – or manmade disasters like hazardous spills, train wrecks, electrical outages, vandalism, riots, and terrorist attacks.

WisWARN does this by providing its members with emergency planning, response, and recovery information before, during and after an emergency. Since WisWARN is part of the nationwide WARN system, it also helps in conducting mutual aid with other states as needed.

The core of the WisWARN website is its emergency equipment database that matches utility resources to a member's needs during an emergency. A member can locate pumps, generators, chlorinators, evacuators, and trained personnel in any emergency.

The WisWARN program supplies its member agencies with:

- A standard omnibus mutual assistance agreement.
- A process for sharing emergency resources among members statewide.
- Resources to respond and recover more quickly from a disaster.
- A mutual assistance program consistent with other statewide mutual aid programs.

- A forum for developing and maintaining emergency contacts and relationships.
- New ideas from lessons learned in disasters.

There are two parts to the website. The public side is open to anyone to view. It has basic information about WisWARN and how to join. The second side, the resource database, is only open to members who have signed the agreement, and it is free.

I encourage all league members to join WisWARN. You can get a membership application and other information on the web at [www.wiswarn.org](http://www.wiswarn.org).

Don't wait until you see the funnel cloud.

On November 12, 2008 the fourth utility joined WisWARN and Wisconsin became the 34th state to have an approved WARN program operating within its border. (WisWARN had to have at least four members before it could officially become operational.) I have also been in contact with many other water/wastewater utilities that are in the process of joining WisWARN. Some of these include the Milwaukee Water Works, the Madison Metropolitan Sewerage District, Wausau Water and Wastewater Utilities, Plymouth Utilities, Lake Geneva Water and Wastewater Utilities and many others. WisWARN is starting up and taking hold.

November 12th was a very good day for me and the other members of the WisWARN Committee. It was also a very good day for you and your utility because someday WisWARN will be of service to you or your utility or to someone you care about in another community. I want to recognize these first four members, but I also want to encourage all utilities to join WisWARN. The first four WisWARN members are:

Green Bay Metropolitan Sewerage District  
Kenosha Water Utility

Watertown Water and Wastewater Utilities  
Stevens Point Water and Wastewater Utilities.

For more information about WisWARN, visit our website [www.WisWARN.org](http://www.WisWARN.org)

Join WisWARN now. [CS](#)



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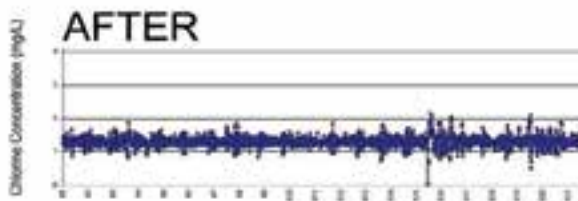
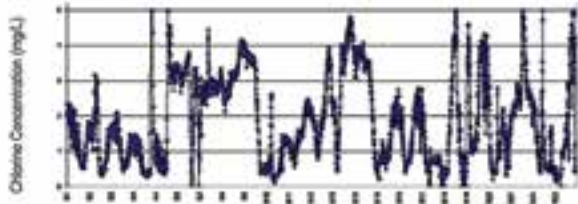
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# WI Section CSWEA Calls on USEPA for a Phosphorus Standard Peer Review



In September 2008, Wisconsin Section members received a request to join the Pennsylvania WEA and others in support of a nutrient standards development issue. A group of Pennsylvania communities had identified problems with EPA's nutrient total maximum daily loads (TMDLs) for five watersheds in Pennsylvania. The TMDLs derived nutrient targets using a new approach called "conditional probability." The phosphorus targets were set at 25 to 40 parts per billion based on aquatic insect impacts rather than plant and algae growth. The group claimed the EPA ignored site-specific data showing no actual impacts to aquatic insects and did not use a scientifically-defensible approach. The group was concerned that EPA's method was unprecedented in water quality standards development and, if applied broadly to nutrients and other complex pollutants, "it would likely produce very restrictive standards based on very weak causal relationships." The primary concern is that the communities will spend millions of dollars

in stormwater and wastewater controls without gaining significant improvement in water quality. The Pennsylvania group requested that EPA commission a formal peer review of the conditional probability method. Such review is required pursuant to federal policies. The group also pointed out that federal law prohibits EPA's modification of national criteria documents or state standards without undergoing a formal notice and comment process, which has not occurred for this new method.

The Wisconsin Section found the Pennsylvania group's concerns similar to our concerns with TMDL target-setting and phosphorus water quality criteria development in Wisconsin. In response, the Wisconsin Section prepared the following letter to the EPA with copies to the Wisconsin DNR. The Section also intend to forward the letter to appropriate Wisconsin legislators. The Wisconsin Section was notified in November that the EPA has agreed to meet with the Pennsylvania group and may agree to a Science

Advisory Board peer review of the new method. Please feel free to contact one of the authors of the letter if you have any questions.


## WISCONSIN SECTION – CENTRAL STATES WEA

Government Affairs Committee  
Jane M. Carlson, PE, Chair  
Strand Associates, Inc.  
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Madison, WI 53715  
608-251-4843  
608-251-8655 (fax)  
jane.carlson@strand.com



By Jane M.  
Carlson, P.E.





October 16, 2008

Mr. Stephen L. Johnson, Administrator  
USEPA Headquarters  
Ariel Rios Building  
1200 Pennsylvania Avenue NW  
**Mail Code:** 1101A  
Washington, DC 20460

Dear Mr. Johnson:

We are writing to request an independent peer review of a new nutrient standard development methodology the United States Environmental Protection Agency (EPA) has employed. We understand the methodology was recently employed by EPA Region III in the TMDL process. It is our understanding that the approach employed by Region III was actually disseminated by EPA Headquarters to Regional Technical Advisory Groups in late 2007 as a new recommended methodology for developing stream nutrient standards. The Wisconsin Department of Natural Resources is currently using this or a very similar method for developing its phosphorus criteria, and we have had many questions and concerns about it. It appears EPA Headquarters intends to use this method on a nationwide basis. Unlike EPA's other published nutrient criteria derivation methods, the new methodology does not consider whether nutrients are causing excessive plant growth but assumes nutrients directly impact sensitive aquatic life (e.g., invertebrates). This is an unprecedented approach and does not appear consistent with EPA's long-standing procedures for water quality criteria development that are based on finding clear causal relationships, not assuming such relationships.

In Wisconsin, the proposed phosphorus criteria are approximately 0.075 and 0.1 mg/L for streams and rivers, respectively. Proposed criteria are even lower for lakes and reservoirs. The proposed criteria for rivers and streams may be attainable if existing mechanical wastewater treatment plants (WWTPs) install advanced filtration and significantly increase their chemical use. Proposed lake and reservoir criteria resulting in effluent limits less than about 0.05 mg/L may not be attainable with current technology, particularly if the limits are expressed on a weekly or monthly average basis rather than an annual average basis. Many municipalities would need to abandon lagoon-based technologies and install mechanical treatment systems. Compliance with the proposed criteria will come with an unacceptably high cost, significantly increased carbon footprints, and water quality benefits that are uncertain at best. The Wisconsin Municipal Environmental Group, a group of municipalities that tracks water and wastewater regulations, has developed probable capital and present-worth costs for about 500 of Wisconsin's municipal WWTPs to attain the proposed phosphorus criteria, and they are on the order of \$5 to \$7 billion. This does not include industrial WWTPs or the 150 or so municipal WWTPs that currently discharge to groundwater, and it does not include the cost of compliance with any future nitrogen standards. It is also possible that the proposed Wisconsin phosphorus criteria will not be achievable by municipal separate storm sewer systems. It is even more unlikely the criteria will be achieved by, let alone enforced for, agriculture. In some Wisconsin basins, agriculture contributes up to 80 percent of the phosphorus loadings.

We understand that on August 21, 2008, a coalition of Pennsylvania municipal entities requested that EPA arrange for an objective and independent peer review of this new nutrient standard development methodology. Based on our review of the coalition's request, there is substantial uncertainty over the technical sufficiency of the new methodology. In particular, two internationally renowned scientists in the field of nutrient control voluntarily reviewed the new approach and concluded it was not scientifically defensible and would likely misdirect local resources. Both individuals recommended that the methodology be peer-reviewed. Moreover, peer review of this issue is supported by both OMB and EPA peer policies that call for such review before implementing precedent-setting procedures or where a new approach alters prevailing practices and substantial regulatory costs will be incurred based on application of the new methods. In light of the highly questionable scientific methods employed and the extreme costs of compliance, it is imperative that a peer review be conducted.

For the reasons explained above, we request that a peer review be promptly scheduled and that any further application of this methodology be deferred pending completion of that review. We look forward to your response to this request.

Sincerely,  
Jane M. Carlson, PE  
Chair, Government Affairs Committee, Wisconsin Section CSWEA

# Plan to attend the 14th Annual CSWEA Education Seminar on Nutrient Removal

APRIL 7, 2009 AT THE MONONA TERRACE  
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The 2009 Education Seminar will be held at the Monona Terrace in Madison, WI on April 7, 2009. The Seminar will focus on nutrient removal and feature presentations and discussions with regulators from all three of the Central States and USEPA Region V as well as national experts in nutrient removal processes including Dr. James Barnard, "the father of biological phosphorus removal" and Dr. Beverly Stinson, a noted expert on nitrogen removal processes and side stream treatment. We strongly urge all facility operators,

managers, consulting engineers and manufacturers who will be impacted by these "Limit of Technology" standards to attend CSWEA's 14th Annual Education Seminar, this year focused on nutrient removal. The Speakers Reception will be the night before on April 6, 2008. Check [www.CSWEA.org](http://www.CSWEA.org) for additional details and for registration materials. [CS](#)



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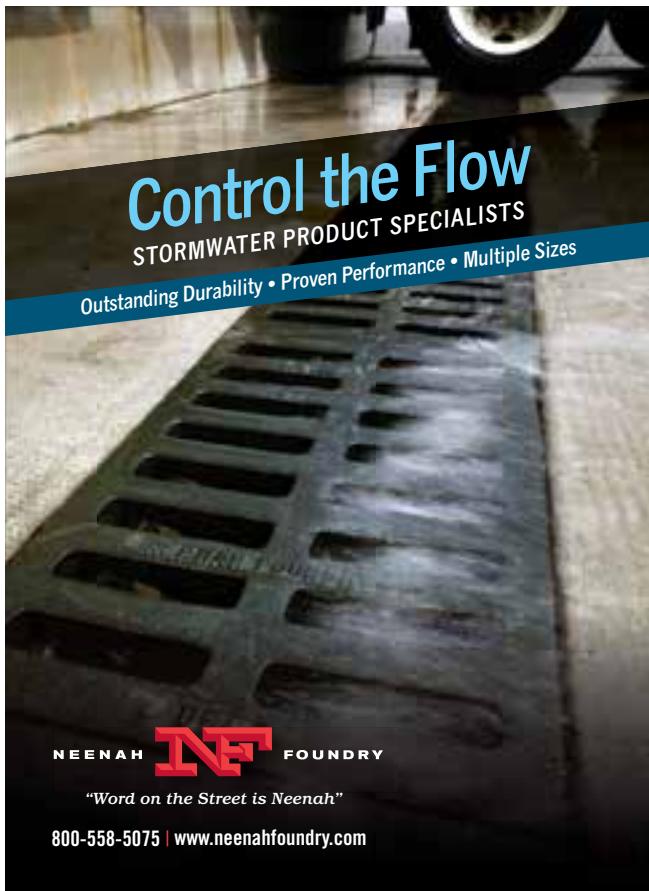


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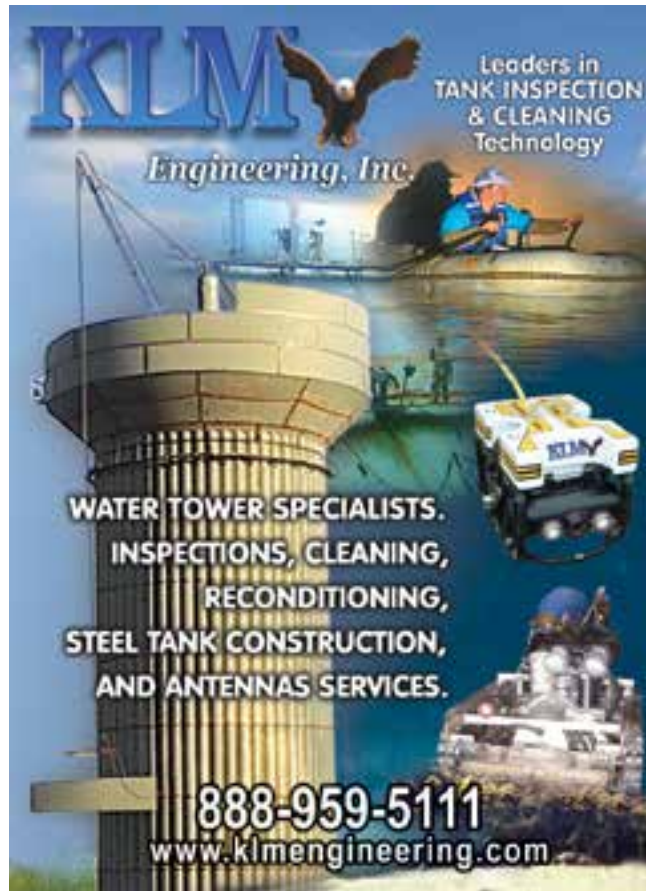
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# CSWEA Looking Toward Maintenance Professionals Certification

By Gary B. Scott, CPMM, Coordinator, Voluntary Plant Maintenance Technologist Certification Program, CSWEA

Water and Wastewater maintenance professionals today must confront a wider variety of technology issues than in the past and therefore must possess an extensive knowledge of the many facets of industrial maintenance. Position descriptions are designed to validate that individuals possess the professional expertise and knowledge required to successfully perform plant and facilities maintenance activities according to the most current professional standards. More than ever before the roles of water and wastewater maintenance professionals involve diverse issues and concerns as organizations work to improve and grow. Yet there are few industry accepted certification programs for maintenance technicians, specifically relating to water and wastewater. The EPA state offices/agents provide licensing and training programs for Collection System Operation, Cross-Connection Inspection, Water and Wastewater Laboratory Testing, and Water and Wastewater Treatment Works Operation, but do not currently sanction such programs for agency maintenance professionals.

The Water Environment Federation (WEF) in cooperation with the Association of Boards and Certification (ABC) has developed a *Voluntary Plant Maintenance Technologist Certification Program* for drinking water and wastewater plant maintenance personnel. CSWEA is excited about participation as a Charter ABC member in this new program, and wants to hear from you.

CSWEA previously participated in a *Voluntary Laboratory Certification Program* from the early '90s until it was discontinued in 1997. Many of our members in Wisconsin may still hold these reciprocal certifications. CSWEA as an ABC member



will have the opportunity to offer Voluntary Plant Maintenance Technologist certification in its WEF Member Association Sections of Illinois, Minnesota, and Wisconsin.

ABC has been assisting states and

provinces with environmental certification programs since 1972. Their membership consists of over 90 certifying authorities representing more than 45 states, 10 Canadian provinces, and 10 international

clients who certify over 150,000 water and wastewater operators, laboratory analysts, backflow prevention assembly testers, and biosolids land applicators. Each year over 35,000 examinees take tests either directly developed, reviewed for validation, or for which technical assistance in development was provided by ABC.

This new maintenance certification program was created to offer multi-level technical certification for individuals employed in the water quality field, whose work functions specialize in disciplines other than plant operations. Effective plant maintenance is a key component to every treatment facilities commitment to compliance, and this program is designed to cover all facets of treatment plant maintenance from entry-level (Class I) competence, to supervisory-level (Class IV) personnel involved in maintenance, electrical, instrumentation, and equipment system selection and design.

CSWEA is seeking personnel involved in the day-to-day maintenance of treatment facilities to complete a job analysis survey. Participation from plant maintenance personnel is essential for CSWEA to provide a quality, valid certification program, so we hope you will assist us by completing the survey.

In this survey, the results will be used to determine the scope and schedule for implementation of this program. You will be asked to provide data on your agency, your facilities staffing, and personal work function which is vital to development of this certification program. It should take you less than 30 minutes to complete the survey, and when survey data is compiled, results will be available for your information. Effective plant maintenance is a key component to every treatment facility so CSWEA is excited about partnering in this new program. The job analysis survey can be found by visiting **[www.cswea.org](http://www.cswea.org)**.

As we work to complete our statements of policies, application procedures, a candidate handbook, testing schedules and other necessary administrative procedures, we anticipate voluntary certification will be available through CSWEA beginning in Illinois in the spring of 2009.

CSWEA has been in direct contact with WEF, the USEPA, Wisconsin DNR, and Minnesota PCA during this process, and we express optimism that the state sections/agencies of EPA will consider initiating licensing programs based on the ABC developed certification program. CSWEA

intends to initiate the Voluntary Plant Maintenance Technologist Program beginning in Illinois, until such time as state sections/agencies of EPA initiate licensing programs as a result of this effort.

A WEF endorsed maintenance technologist certification program in both water and wastewater maintenance may be long overdue, but will provide benefit to your agency's staff retention, individual industry-specific technical development for maintenance technicians, and provide another tool to bolster training programs offered to members of CSWEA.

An integral part of CSWEA's mission is to enhance the education and effectiveness of its water quality professionals through training, certification, dissemination of technical information, and promotion of sound policies to benefit society through protection and enhancement of the water environment. If you have interest in this discussion let CSWEA know. We are in this with you.<sup>CS</sup>

For more information, contact Gary B. Scott, CPMM, at the Glenbard Wastewater Authority [gscott@gbww.org](mailto:gscott@gbww.org)  
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# An Exciting Year

By Steve Godfrey

This has been a busy year for the WI Section. The Management Seminar held in August at Cabellas was once again a sell out and provided attendees with a wealth of useful information. Also in August the Collection System Committee launched the first annual Northwoods Collection System Seminar in Marshfield which proved to be a successful event. Another first annual event that exceeded all expectations was the Industrial Waste Conference held in Oshkosh, hosted by the Industrial Waste Committee.



With this year's WEFTEC being more or less of a home game in Chicago, the WI Section was well represented at the conference. A big thank-you goes out to Tom Mulcahy and his staff for organizing a charter bus to bring 56 operators, vendors and students for a one-day sampling of the conference as well as sponsoring a great Packers party for us Wisconsinites on Sunday afternoon. The CSWEA reception on Sunday evening was a first-class event, as usual and provided a great opportunity to mix with our MN and IL Section colleagues.

Although we once again proved we can party with the best, our Wisconsin contingent was also well represented in the technical, educational and organizational components of WEFTEC. There is not enough space in this article to acknowledge all who participated as presenters, moderators, vendors, etc. but your efforts are greatly appreciated. The Section was able to financially assist several of our student chapter members who may otherwise not have been able to participate. Congratulations go out to Jonas Balistreri and the team from UW-Madison for

earning a third-place finish in the student design competition, and a thank-you to Joan Hawley for sponsoring several young professionals and students at the WEF Collection System Committee luncheon. For all who attended the technical sessions and walked the seemingly endless rows of vendor displays WEFTEC certainly provided a big picture view of the advances in research and technology that drives our industry.

In other section news, we had our annual business meeting in Fond du Lac on November 21 which gave us a chance to reorganize and

recharge our committees and chart a course for the coming year. We will be elected a new section vice chair as well as a new trustee and discussed candidates for various Section and CSWEA awards. We are initiating our activities to support the World Monitoring Day organization and will be providing materials to several state school groups. Through the efforts of Jane Carlson we continue to monitor and offer our opinions and expertise in EPA's ongoing efforts to establish stream nutrient standards.

The Young Professionals group continues to take the lead in reaching out and assisting our growing student chapters. A good example is the December "Night with Industry" dinner event with the Madison student chapter, which is a great opportunity for students and professional alike to meet and exchange ideas and information.

Well, there is a lot going on in the Wisconsin Section these days and I'm looking forward to an even busier 2009. Have a great winter. [CS](#)

"With this year's WEFTEC being more or less of a home game in Chicago, the WI Section was well represented at the conference."



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# Liquid Assets

By Roger Gyger

Hopefully, many of you at had an opportunity to visit WEFTEC '08 in Chicago. By any measure the conference was a great success with a record number of technical presentations, attendees (more than 20,000) and exhibit space. The Local Arrangements Committee for the conference was a joint effort with IWEA. Many CSWEA members volunteered time at the Local Host Booth and a number of other local conference related activities. WEFTEC will be returning to Chicago in 2013, which will be the start of the alternate city rotation between Chicago and New Orleans.

The Illinois Section Annual Maintenance and Safety Seminar was held in November at the City of Naperville Training Facility with 25 enthusiastic attendees from a number of municipalities on hand. Eight presenters from a variety of organizations provided practical information on pumps, lubricants and safety audits and regulations. A tour of the Naperville Springbrook Water Reclamation Facility followed the seminar presentations. The proceedings (presentations) from the Maintenance and Safety seminar will be posted on the CSWEA website in December.

The Illinois Section participated in World Water Monitoring Day by purchasing 30 test kits and distributing them to schools




in Downers Grove, Rochelle and De Kalb, Illinois. There was a variety of interest from other school-related groups and next year the Section will obtain a larger number of test kits to address this broader interest in the program.

The Water Is Life and Infrastructure Makes It Happen program continues to expand with a variety of new tools being introduced by WEF. A 90-minute documentary film entitled *Liquid Assets* has been airing on local PBS stations and a 16-minute overview can be accessed at <http://liquidassets.psu.edu/overview>. A

Water Is Life display and handout materials are being used at all of the Illinois Section seminars.

The 2009 Seminar Program is now taking shape with the kick-off being the joint Government Affairs meeting with IWEA. This meeting will be held at the Willowbrook Holiday Inn on January 28, 2009, with a cross-section of technical and regulatory presenters. Plans are also being finalized for the Laboratory Seminar (with IWEA), Collection Systems and Operations seminars later in the year.

We wish everyone a happy and safe holiday season and a prosperous New Year. 

“The Water Is Life and Infrastructure Makes It Happen program continues to expand with a variety of new tools being introduced by WEF.”



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# Be a Part of Minnesota's Activities

Doug Henrichsen, MN Section Chair

**T**he MN Section has been active over the last few months planning, organizing, and attending our special events. Recent activities included:

The MN Section CSWEA/Air & Waste Management Association (A&WMA) combined forces again this year to provide an outstanding 23rd Annual Conference on the Environment. The conference was held on Thursday, November 6, 2008, at the Earle Brown Heritage Center in Brooklyn Center, MN. Approximately 135 people attended, representing equipment vendors, consultants, municipalities, agencies, private corporations, students, teachers, and others to provide a well-rounded conference. John Glatzmaier (Past Chair, MN Section) and Chris Nelson (Current Chair, A&WMA) lead the planning committee and did a wonderful job. Numerous individuals stepped forward to assist with the planning and execution of this event. The conference was sponsored by several generous firms, as well as several firms stepped forward to exhibit at the conference.

The MN Section Business Meeting was conducted during the Conference on the Environment. George Sprouse (Secretary/Treasurer) gave a summary of the section's current financial state. Patti Craddock (MN Section Trustee) gave a summary of her report to the CSWEA Executive Board, which included discussion on several upcoming events (Energy Mgmt Workshop, Midwest Water Industry Expo, Education Seminar, Annual Meeting, CSX, and others). She also discussed the Children's Water Festival, World Water Monitoring Day, and Public Education Committee activities. It was noted that we will need someone to step forward in January 2009 to take the lead for planning the Stockholm Junior Water Prize, as the current chair will be moving on to other matters. Colleen Thompson (MWOA trustee) outlined her report, which discussed the current efforts being made to update the MWOA website, as well as gave an update for the upcoming MWOA annual conference. Discussion also took place regarding the MN Section's efforts to provide \$1,000



in scholarships (in 2008 & 2009) to support MWOA's efforts to award three scholarships to noteworthy students who desire to further their studies of the environment. Les Lange (Operations Committee Chair) gave an update for the upcoming Innovative Approaches Conference to be held in St. Cloud in February of next year. Allison Sumption (S&YP Committee Chair) gave a summary of recent S&YP activities, which included a group of MN Section people attending a pizza party with several graduate students from the University of Minnesota. The purpose of the

meeting was to acquaint graduate students with the benefits of joining CSWEA and to discuss opportunities to connect.

Several positions that need to be filled were discussed at the Business Meeting. John Graupman stepped forward to take the chair of the Biosolids Committee (Thank you, John!). Other chair positions still needing to be filled include the Government Affairs and Membership committees. If you wish to be the leader of one of these important committees, please feel free to contact me. To learn more about these opportunities, please visit our website: <http://www.cswea.org/minnesota>.

Several service awards were given out to members who have stepped forward and offered their time to further the activities of the MN Section. Those receiving awards included:

- Secretary/Treasurer, 1999-2006— John Smith
- MN Section Trustee, 2006-2008 — Dave Raby
- MN Section Chair, 2007-2008 — John Glatzmaier

Mark your calendars for several upcoming events for the MN Section:

- February 24, 2009. MN Section CSWEA/MWOA 25th Annual Innovative Approaches to Wastewater Operational Problems Seminar, St. Cloud, MN.
- June 2009. MN Section CSWEA/MWOA Laboratory Training Seminar (to be determined)
- July 28-31, 2009. MWOA 33rd Annual Conference, Grand Rapids, MN. [CS](#)

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## JANUARY

2009 Joint IL Section CSWEA-IWEA Government Affairs Seminar  
Wednesday, January 28, 2009  
Willowbrook Holiday Inn at Rt. 83 and I-55

## FEBRUARY

Midwest Water Industry Expo  
February 10-11, 2009  
Kalahari Resort & Convention Center  
Wisconsin Dells, WI

WI Section Government Affairs Seminar  
February 19, 2009  
Madison, WI

MN Section CSWEA/MWOA 26th Annual Innovative Approaches to Wastewater Operational Problems Seminar  
February 24, 2009  
St. Cloud, MN

## MARCH

Spring Biosolids Symposium  
March 10, 2009  
Stevens Point, WI

## APRIL

14th Annual CSWEA Education Seminar  
Focus on Nutrient Removal  
April 7, 2009  
Monona Terrace, Madison WI

## MAY

82nd CSWEA Annual Meeting  
May 18-22, 2009  
Lincolnshire Marriott  
Lincolnshire, Illinois

## JULY

CSWEA CSX-YPX '09  
July 16-17, 2009  
Kalahari Resort and Convention Center  
Wisconsin Dells, WI

## OCTOBER

WEFTEC '09  
October 17-21, 2009  
Orlando, FL



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