

# CENTRAL STATES WATER

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

## Wastewater: Part of the Energy Solution



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# Partner for the Future

By Tim Tack



As I sit here and type with one hand and hold my new baby girl in the other, I am reminded why we get up every morning and do the work we do – college tuition. Kidding aside, we all rise early, stay late, serve on committees, train, etc. because we care about the environment. We all look to the future and want to ensure our children's children have clean water. If it were not for the Clean Water Act in 1972, our country would not be where it is today. I believe the Clean Water Act is one of the greatest legislative accomplishments of the 20th century, though I'm sure most Americans fail to appreciate how or why they have clean water.

We used to measure the health of a waterway by whether or not it could catch fire. Now we are concerned about discharging microconstituents, trace chemicals in land applied biosolids, and removal of every little bit of nitrogen and phosphorus. A few years ago, we did not have tests to measure some of these contaminants. Despite wastewater plants producing near drinking water caliber effluent, it seems that in the public's opinion we are polluters instead of environmentalists. They do not realize that our WWTP discharges are often cleaner than a majority of pristine waterways. Our problem is public perception, not our actions.

In this case "dilution is not the solution" because our industry's talent is spread too thin. While everyone may have the same goal in mind, we all employ different methodologies. That is why CSWEA has committed to partnering with other like-minded organizations. This year we are hosting technical sessions or events with

USEPA, WWOA, IWEA, WWA, MWOA, and IAWWA, to name a few. While each group has its own agenda, our hope is that these cooperative efforts facilitate "one voice for water". This is an initiative that WEF is trying to promote, so the public turns to us for answers when questions arise about the water environment. It also just makes a lot of sense. After all, the primary goal of all our organizations is education. In addition to these cooperative efforts, CSWEA is involved in many other activities.

## CSX 2008

On July 17-18th, the CSWEA-CSX-YPX Exchange was held at the Kalahari in the Wisconsin Dells. While I was celebrating the birth of my new daughter, I heard that everyone was having fun and working hard for the organization. This year's exchange was unique, because we invited the Young Professionals to attend the second half of the exchange. Further information on the Exchange will be detailed later in the magazine.

## WEFTEC 2008

Do not pass on this great opportunity. WEFTEC 2008 will be hosted in Chicago from October 18-22 at McCormick Place. WEFTEC is the largest technical exhibition and conference of its kind in North America and offers water quality professionals from around the world with the best water quality education and training available today. This conference is guaranteed to have something for everyone.

Many of our members as well as members of IWEA are serving on the local arrangements committee for WEFTEC. We have been busy arranging the Plant Tours,

Golf Outing, Local Issue Papers, Host Booth, and WEFTeach. On behalf of the association, I would like to thank **Scott Trotter** and **Brian Perkovich** for co-chairing this committee as well as the many other members for serving on the committee

## A few highlights of the conference are:

The Executive Committee meeting will be held Sunday morning October 19 at the Sheraton Chicago Hotel & Towers. All association and section leaders are welcome to attend.

The WEF/WERF Golf Outing will be held Sunday morning October 19 at George Dunne National. The sponsorship proceeds from this outing will be donated to WERF, a nonprofit organization that helps preserve the water environment and protect human health by providing science and technology research to enhance management of our water resources. If you are interested in sponsoring a hole or participating in other sponsorship opportunities, please contact me [tim@leyassociates.com](mailto:tim@leyassociates.com).

We will be sponsoring two Student Design Teams, which will be competing on Sunday October 19 from 12:30 to 4:00 p.m. Please come support our students.

The annual CSWEA/IWEA reception will be held at the Sheraton, on Sunday evening, from 5:30 to 7:30 p.m. This is always a popular event and I am sure the local venue will produce a record attendance.

The Operation Challenge teams will be demonstrating their skills on Tuesday October 21 in Hall C2. CSWEA will again be sponsoring two teams, so please take some time to watch and support them.

*I look forward to seeing you in Chicago. CS*

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# Energy

Eric R. Lecuyer



Much of this issue of *Central States Water* has been dedicated to energy management in water and wastewater. Faced with varying energy supplies, our nation has become focused on increasing production, conservation and the development of alternative forms of energy. While not wishing to enter the political fray regarding which approach is best, it is clear that action is needed to assure that we have sustainable energy supplies and to reduce our carbon footprint to preserve the world as we know it. Water and wastewater facilities are major consumers of energy and as costs have escalated over the years, some efforts have been made to improve efficiency and reduce consumption, but clearly the efforts of the past pale compared to the opportunities and challenges presented currently and in the future. We need to include a comprehensive assessment of energy costs associated with improved facilities and for new regulations. The imposition of standards for removal of nutrients to an extremely low level must include an analysis of the added energy needs in order to provide for a thorough analysis of benefits versus costs and environmental impacts. The triple bottom line must be viewed in these decision-making processes.

Wastewater facilities offer many opportunities to recover un-tapped energy sources and this issue of *Central States Water* highlights some of those sources as well as the view from USEPA and information on a workshop hosted by CSWEA and USEPA on energy management. Whether we are able to better use the excess digester gas from our anaerobic processes, rather than flaring the excess, or the recovery and conversion of heat energy to electricity as part of a Combined Heat and Power (CHP) process, or simply make



better and more efficient use of the energy we do consume, we as an industry have a critical role to play. As new technologies emerge, I am sure that even more cost effective and efficient processes will be developed to reduce energy needs and recover energy as it is used.

There has been a lot of focus on ethanol production and we cover that topic as well in this issue, with an article on wastewater effluent reuse in that production process. The full benefits of ethanol have been argued with the required energy inputs for the growing and processing the needed crops and the conversion of those crops to ethanol are either very near or exceed the energy provided by the finished product, depending on who you listen to. Wastewater has a role to play in the production of ethanol with rich nutrients available to act as fertilizers for the growth of non-traditional food crops that can be dedicated for ethanol production.

Marginal lands, not capable of supporting critical food crops could be converted to rich growing fields for grasses and other bio-mass creating plants through soil augmentation and irrigation from wastewater bio-solids and effluents. Land application of wastewater treated to lesser levels than are needed for discharge to our pristine water ways could both reduce construction and operating costs, reduce our carbon foot print and provide for renewable energy sources right here in the United States.

There is no single solution to our combined concerns for dependable energy sources and reduced emissions that lead to climate change, but as water and wastewater professionals, we must do our part and develop these technologies and management practices to reduce our consumption of energy and contribute to the development of new energy sources. Our very future depends on taking action. **CS**



# WEFTEC '08 on the Horizon



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McCormick Place • Chicago, Illinois  
Conference: October 18-22, 2008  
Exhibition: October 19-22, 2008

**81st Annual Water Environment Federation  
Technical Exhibition and Conference**

### WEFTEC'08 has Local Flavor

WEFTEC '08 promises to be an exciting time for Central States, since it is being held in its own backyard.

The largest water quality event in North America is heading to the Windy City! The latest in water quality research, technology and services will be on display at WEFTEC '08.

If it is about water, it will be at WEFTEC. WEFTEC offers the best water quality education and training available today and

is a leading source for water quality developments, research, regulations, solutions, and cutting-edge technologies.

Don't miss your opportunity to join thousands of water and wastewater professionals at WEFTEC '08 – The Water Quality Event!

Visit [www.weftec.org](http://www.weftec.org) to view technical sessions, workshops, events, and to create your own schedule with the WEFTEC Online Schedule Planner.



## Bicycle Ride Along Lake Michigan

Sunday, October 19

9:00 a.m. - 12:00 p.m.

Lakeshore Drive Bikeway

*Organized and Planned by Volunteers to benefit Water For People*

**A**ttention bicycling enthusiasts! Join other WEFTEC attendees as they pedal to raise awareness and funds to support Water For People. You will bike past museums and parks, and enjoy great views of the Chicago skyline and Lake Michigan. WEF members and guests of all cycling abilities are encouraged to join in the ride. The group will be divided into several groups based on riding ability and speed. There will be a rest stop with sports drinks and water at the halfway point and the end. The course will be 18 miles round trip, or you can elect a shorter ride.

The cost of the ride is \$50 for riders who have their own bicycle and helmet, and \$70 for riders who will need to rent equipment. All participants will receive a colorful cycling jersey. Proceeds from the event will benefit Water For People.

Riders will meet at 9:00 a.m. at Bike Chicago Rentals and Tour Shop, located at 239 E. Randolph St., across from Millennium Park. The ride will end at Millennium Park before 12:00 p.m. For more information, please contact George Patrick at [georgepatrick@bellsouth.net](mailto:georgepatrick@bellsouth.net) or Kim Holland at [KHolland@mariettaga.gov](mailto:KHolland@mariettaga.gov).



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## LOWER BIDS ARE NOT ALWAYS THE BEST ECONOMICS

**PROPER CLEANING PROCEDURES ARE THE BEST ECONOMICS.**

**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.

**Midwest Mobile Washers of Illinois** has offered water tower and water storage tank cleaning service for over fifteen years. We clean and safely remove mildew stains on the exterior sides of water towers and water storage tanks. In due time the mildew stains cause damage to the painted surface causing it to crack, peel and flake which eventually leaves rust marks on the surface of the tank.

**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.

**One of our trademarks** is after the tank is cleaned, we apply a mildew inhibitor to help retard mildew growth. With this inhibitor applied, mildew stains will stay away for years to come depending on the surrounding atmosphere.

**Midwest Mobile Washers** always consults with engineering companies and paint manufacturers to ensure all safety and proper cleaning methods are applied by their recommendations. Our washing and cleaning procedures of water towers and water storage tanks are completely and totally 100% frictionless. We use no cables, wheel baskets or other fancy hanging devices that rub or scratch the painted surface. Midwest Mobile Washers uses qualified products and applies them in the safest manner.

**Our goals are simple**, "To save the paint". We would be more than proud to extend the life of paint on water storage tanks by several years with an ongoing maintenance program.



Anthony Allan



08

## Opening General Session

**Sunday, October 19**

4:45-6:15 p.m.

John Anthony Allan, the 2008 Stockholm Water Prize Laureate and a professor at King's College London and the School of Oriental and African Studies, will deliver the keynote address during the Opening General Session of WEFTEC '08.

Professor Allan is recognized for introducing the concept of "virtual water" which measures how water is embedded in the production and trade of food and consumer products. This concept has major impacts on global trade policy and research, especially in

water-scarce regions, and has redefined discourse in water policy and management.

Professor Allan will anchor a well-balanced program of presentations from both inside and outside the water quality field on the latest water-related topics. Scheduled for Sunday, October 19 from 4:45 p.m. to 6:15 p.m., this high-profile event sets the tone for the conference that draws thousands of water quality professionals from around the world each year.



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# CSWEA/IWEA to Host

## 13th Annual WEFTEC Welcome Reception at WEFTEC '08



CSWEA and IWEA members are invited to join us for this year's WEFTEC '08 CSWEA/IWEA Reception, Sunday, October 19, 2008. The reception will be held from 6:00 to 8:00 p.m. at the Sheraton Chicago Hotel and Towers. Our joint WEFTEC Welcome Reception has grown into a not-to-miss event for members and friends attending WEFTEC and offers an outstanding kick-off each year. The reception will be held in the Chicago IV room of the WEFTEC '08 headquarters hotel.



## WERF/WEFTEC '08 Golf Tournament

**Sunday, October 19, 2008 • 8:00 a.m. Shotgun Start • Ticket cost: \$130 • George Dunne National Golf Course, Oak Forest**

### The course

Recognized by *Golf Digest* as one of the top public courses, George Dunne National is a premier 18-hole course located in southwest suburban Oak Forest. Dunne National offers the unique feature of bent grass fairways and greens. Eight lakes (which come into play on 11 of the course's holes), tree-lined fairways, and an abundance of wildlife all combine to make your golf experience a memorable one. The course measures 7,262 yards from the gold tees and has a slope rating of 142.

### The tournament

The \$130 entry fee includes a continental breakfast, range balls, golf, cart, prizes, unlimited beverages and lunch. Bus transportation will be provided from key convention hotels. All proceeds will benefit the Water Environment Research Foundation (WERF), a nonprofit organization that helps preserve the water environment and protect human health by providing science and technology research to enhance management of our water resources.



### Sponsorships

For information regarding sponsorship opportunities, please contact Tim Tack at 847-392-0990 or email [tim@leyassociates.com](mailto:tim@leyassociates.com).

### Registration

**Space is limited, so please be sure to register early. There are four ways to register:**

Download the registration form and fax it to 708-344-4444. Payment must accompany the registration form. (Registration form will be available soon.)

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# WEF Teach™

14th Annual WEF Teach™ • Monday, October 20, 2008 • 8:00 a.m.-4:30 p.m.

The award-winning 14th Annual WEF Teach™ will present a full-day train-the-trainer teacher's workshop that shows innovative ways to engage youth in real life water problems and solutions. WEFTEC's economy of scale will be leveraged to bring the Chicago host community an education that will last for years to come – exposing thousands of students to water environment issues and challenges.

WEF Teach™ 2008 will invest in area schools by providing two hands-on water education programs: Sewer Science, a mobile mini-wastewater treatment plant that challenges students to treat water to the same US EPA standards expected of municipalities; and the 10-Day Water Environment Curriculum, a comprehensive curriculum on the water cycle, wastewater treatment, and the relevance of our water environment.

## The preliminary agenda is as follows:

- 7:45 a.m.** Registration opens, coffee, and rolls
- 8:15 a.m.** Welcome, Sewer Science Introduction
- 8:45 a.m.** Sewer Science Laboratory I  
or  
10-Day Water Environment Curriculum

**11:45 a.m.** Banquet lunch & program  
(Guest Speaker TBA)

**1:15 p.m.** Sewer Science Laboratory I

or

10-Day Water Environment Curriculum

**4:15 p.m.** Evaluation

WEF Teach™ is made possible through a partnership of corporations, water agencies, engineering consultants, non-profit community organizations and caring individuals, and has received rave reviews from educators in each of the cities where it has been offered such as Chicago, Miami, Dallas, Orlando, New Orleans, Anaheim, Atlanta, Los Angeles, Washington D.C., and San Diego.

WEF Teach™ is designed for local area teachers. Educators outside of the Chicago area will be considered on a first-come, first serve basis as seats are available. Because it is generously sponsored, WEF Teach™ is offered for a nominal fee of \$10 and includes materials and a banquet lunch.

To learn more about WEF Teach™ please contact Stevi Hunt-Cottrell, WEF Public Communications, at [shunt-cottrell@wef.org](mailto:shunt-cottrell@wef.org).



The WEFTEC '08 Local Arrangements Committee, comprised of CSWEA and IWEA members has been working to support WEF Teach in Chicago. Please contact Kendra Sveum, [sveumkd@cdm.com](mailto:sveumkd@cdm.com) or 312-780-7712 to find out how you can get involved. [CS](#)

## Industry Event



In celebration of the WEFTEC Show in Chicago, local pump system manufacturer Metropolitan Industries, Inc. will demonstrate advances in "green" pumping technology at their headquarters in nearby Romeoville on October 21 throughout the day.

A complimentary shuttle bus service will transport visitors round trip from McCormick Center to Metropolitan headquarters and a catered lunch will be provided. For information on scheduling, visit [www.GreenWaterSystems.US](http://www.GreenWaterSystems.US) or phone 800-323-1665.

# WEFTEC Exhibitors

Be sure to visit these Central States exhibitors at WEFTEC.

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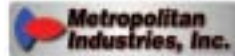
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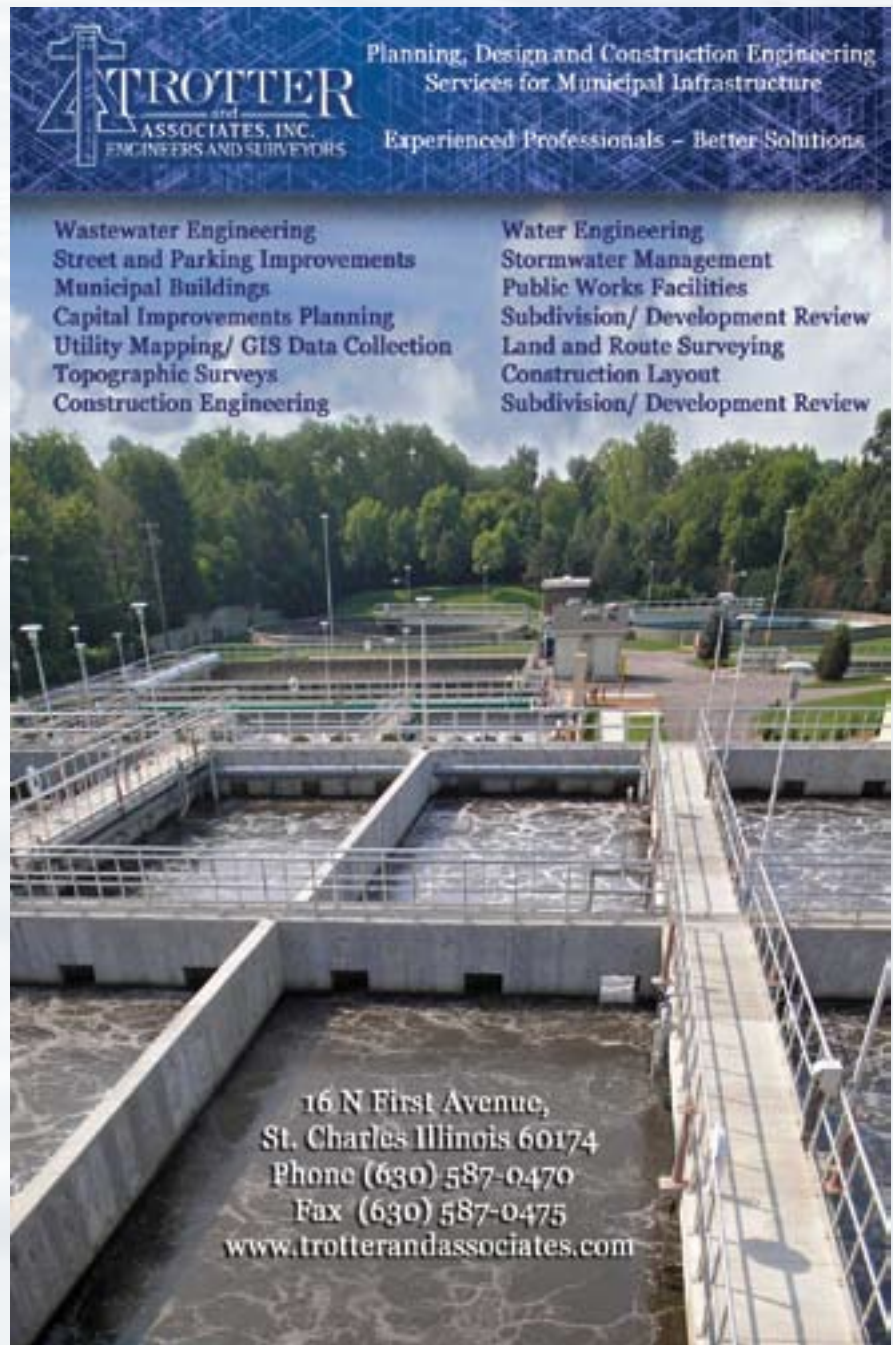
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# 21 Years of the CSWEA Operations Challenge

By Jim Miller

In the beginning there was an idea. This idea was to put forth competitors from across the membership of the Water Environment Federation to come together at the Annual Conference and get operations, maintenance, lab and collection workers involved. This was good. But no one knew at the time how good it was. The first competitions had some interest but were not totally refined as to how they would come about and what the exact events were going to be until the games began. Over 21 years, that has changed. All of the events are well orchestrated and participants know pretty much everything that they will be expected to do in the lab, maintenance, collection and safety events. The operations event will also be pretty much like taking a speed round of the highest level certification exam where you can expect the unexpected.

Central States competitors have adapted and taken a unique approach to the competition. Since the CSWEA teams (Shovelers and Pumpers) have had only one thing in common since the beginning. That is one of their perpetual coaches who have been involved as a competitor or coach in all of the Operations Challenge teams preparation over the life of the competition.

The first competition in Dallas, Texas found members of the CSWEA Challenge teams meeting one another on the steps of the convention center. This was drastically different than the other teams who primarily came from the same facility and had competed at a local level competition before arriving at the WEF conference. Despite this disadvantage – CSWEA teams were able to compete. Not necessarily at the top of all events but have had shining examples of top ten finishes and recently a first place in the laboratory event.

The primary concept that the teams held was that this was an opportunity to gain access to the premier wastewater conference in the world and have a chance to interact with other CSWEA members. Most of the team members would not have been able to attend the conference as their employers would not have

normally allowed them to attend without the support of the sponsors and CSWEA. Over the years that general concept of interaction between members has been one of the most beneficial aspects of the Challenge.

We view our young professionals as the leaders of the association and profession in the coming years. This could be no more evident than that of our Challenge participants. Looking back at some of the first team members we find that several names from 1988 and 1989 have grown along with the organization. Names like Lamont Albers, Jim Miller, Eric Lecuyer, Paul Lange, John Fisher, Andy Alvey, Mark Surwillo, to name a few. Future teams included others like: Dennis Lindeke, Glenn McCarty, Jeff Bratz, Dennis McKenzie, John Szwedo, and many, many more.

A quick look of the list includes several key officers of the past decade and a number who are now holding office in the association. These committed individuals have become and remain involved with the association due in a very large part – their involvement with the Challenge.

*continued on page 18*





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## We view our young professionals as the leaders of the association and profession in the coming years.

Some of the highlights of the Challenge have included competition in San Francisco in 1989 when the earthquake cut short the competition that was running late due in part to a broken pump that was damaged during one of the team's event. International competition occurred in 1990 when teams went to Toronto to compete. Teams in 1991 went to Washington, D.C. only to find the government had shut down (but did re-open just in time for the teams to head home). As mentioned earlier – a first place in the laboratory event was achieved in 2006. Many other great performances were put on by members of the teams and only once during the entire history of the competition, did one of our teams come in last. Even that occurrence should be tempered with the fact that ALL of the other teams are from the same state and nearly all from the same facility.

We bring forth members from Wisconsin, Illinois, and Minnesota. Get together for a couple of practice sessions in Madison and then head to the competition. It is remarkable that with the minimal practice times available to our teams, they have such a high level of performance. Our members must be well above average to continue to achieve this result. Our coaches and team members are very good at what they do. Our sponsors include the employers of the participants and the good folks at Madison Nine Springs Facility who host the practice sessions and all those who donate funds and moral support are a large part of the success of this venture.

Please continue to support the Operations Challenge and recognize that many of our past, present, and future leaders will come through this program. See you in Chicago! [CS](#)



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# CSWEA/USEPA Energy Workshop

December 4, 2008  
Monona Terrace Conference Center  
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## Objectives:

- 1) Meet and learn from peers about their efforts to improve energy management using a Plan-Do-Check-Act approach.
- 2) Learn how the steps and tools in the Energy Management Guide can be applied to challenges utilities are facing.
- 3) Become familiar with EPA and state tools and resources to support energy improvements.
- 4) Take information, experiences, tools and resources and turn into actions to improve energy management.
- 5) Gain interest from utilities in follow on assistance from EPA and states after the workshop, consistent with overall project goals consistent with the Energy Management Guide and overall project goals.

## Tentative AGENDA

**7:30-8:00 a.m.**

Refreshments and informal networking

**8:00-8:15**

Welcome and introductions

*James Horne, EPA Office of Water,  
Washington, D.C.*

**8:15-8:45**

What energy challenges do we face today?

What have water and wastewater utilities already done?  
What's missing?

**8:45-9:15**

Developing an energy management program using the Plan-Do-Check-Act (P-D-C-A) approach  
Hands-on exercises

**9:15-9:30**

Break

**9:30-10:15**

What is the Plan-Do-Check-Act approach and how are utilities using it effectively?

An introduction to management systems with experiences from practitioner.

**10:15-11:00**

How much energy do we use and where do we use it?

How do we find opportunities for better energy management? Collecting baseline information through Energy Star Benchmarking Tool and Energy Audits

**11:00-12:00**

Introducing the PEER Centers

**12:00-1:00 p.m.**

Lunch

**1:10-1:40**

What should we work on first?  
Identifying priorities

**1:40-2:10**

Which goals should we set?  
Setting performance improvement objectives and targets

**2:10-2:45**

How do we move to action?  
Turning plans into actions

**2:45-3:00**

Break

**3:00-3:20**  
Using the Energy  
Management Guide

**3:20-3:45**  
What's next?

**3:45-4:00**  
Wrap up, evaluations, adjourn

## About the trainers

**Faith Leavitt**, a principal with Global Environment & Technology Foundation (GETF), has expertise and experience designing, implementing, and auditing environmental, energy and security management systems, change management, and enterprise training at local, national, and international levels. Faith designs environmental management system, energy management system, and security management system

implementation tools and strategies and provides management system training and technical assistance to industry, government entities, seaports, and small and medium-sized businesses.

Since 1997 Faith has been the lead trainer and technical assistance provider for three U.S. EPA-sponsored environmental management system (EMS) projects for government entities involving 35 municipalities, counties, and states in EMS development and implementation. For the past four years Faith has served as the project manager and lead trainer/technical assistance provider in two American Association of Port Authority/US EPA sponsored management system initiatives for Ports, assisting 20 seaports in developing and implementing environmental management systems and security management systems using the

Plan-Do-Check-Act (PDCA) management approach. She was selected by the US EPA Office of Water to design and facilitate innovative energy management workshops in US EPA Regional offices across the U.S in 2008 and 2009. Additionally, Faith leads EMS implementation projects for the US Department of Energy, US Department of Defense, and for the Stennis Space Center and Dryden Flight Research Center of NASA. Faith has written numerous articles and guidance materials on the PDCA management approach, on EMS application, benefits, and integration with other management systems (security and asset management) including Ensuring a Sustainable Future: An Energy Management Guidebook for Water and Wastewater Utilities for EPA and on environmental ethics. She is certified in the ISO 14001 EMS Lead Auditor coursework. Faith Leavitt received her BA from the University of Massachusetts and an MA from Rowen College, Glassboro, NJ.

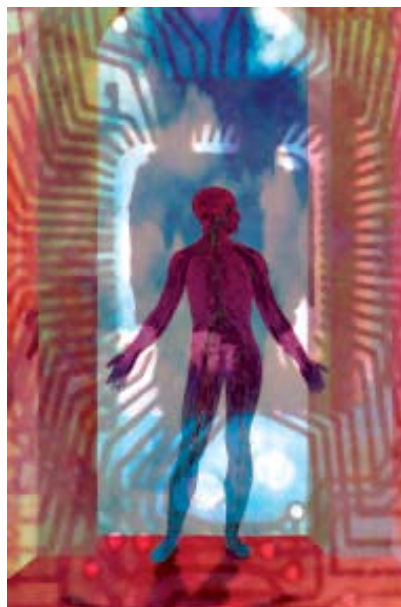
**Madeline Snow**, Director of the EMS Service Program, has expertise and experience in developing and auditing Environmental Management Systems in public transit authority facilities, colleges, universities, and municipalities. She recently developed An Environmental Management Guide for Colleges and Universities for EPA Region 1 and contributed to the development of Ensuring a Sustainable Future: An Energy Management Guidebook for Water and Wastewater Utilities for EPA. She spent 25 years in the Massachusetts Department of Environmental Protection in a variety of programs, including enforcement, water quality planning, waste site cleanup, emergency response, and strategic planning. She holds a BA in Biology and Environmental Studies from New College of Florida and an MPA from Harvard University's Kennedy School of Government. [CS](#)

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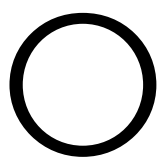
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# CSWEA's CSX/YPX '08 Wrap-Up

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Once again, leaders from CSWEA at all levels gathered at the Kalahari Resort in the Wisconsin Dells for two days of brainstorming and strategic planning on ways to improve our association. New for 2008, we included a day for Young Professionals, (YPX) and many outstanding and inspiring presentations were enjoyed by all in attendance. Here is a rundown of the Big Ideas that we compiled at CSX-YPX '08.



## BIG IDEAS

1. Change perception of CSWEA to be operator-inclusive
2. Send *Central States Water* to every POTW in the three states.
3. More operator focused articles in *Central States Water* (plant/operator profiles, ask the expert, troubleshooting, etc.).
4. Create an "Operators Forum" at Annual Meeting.
5. Improve/enhance CEUs for all events.
6. Need to influence managers as to the value of CSWEA training events.

7. Create a CSWEA Leadership Academy.
8. Motto "Join CSWEA and become a leader...enhance your career".
9. Create WWT Accreditation program (all levels, manager, operators, maintenance technicians, etc.).
10. E-Blast CSWEA Associate membership (only \$20) invitations to POTWs, managers, firms, etc. to market new membership category.
11. Better engage university/college professors to assist with student recruitment into field and CSWEA.
12. Offer education seminar to student chapters as a webinar.

13. Develop Humanitarian Environmental Design competition award; set the example for WEF.

14. Market to YPs via managers.

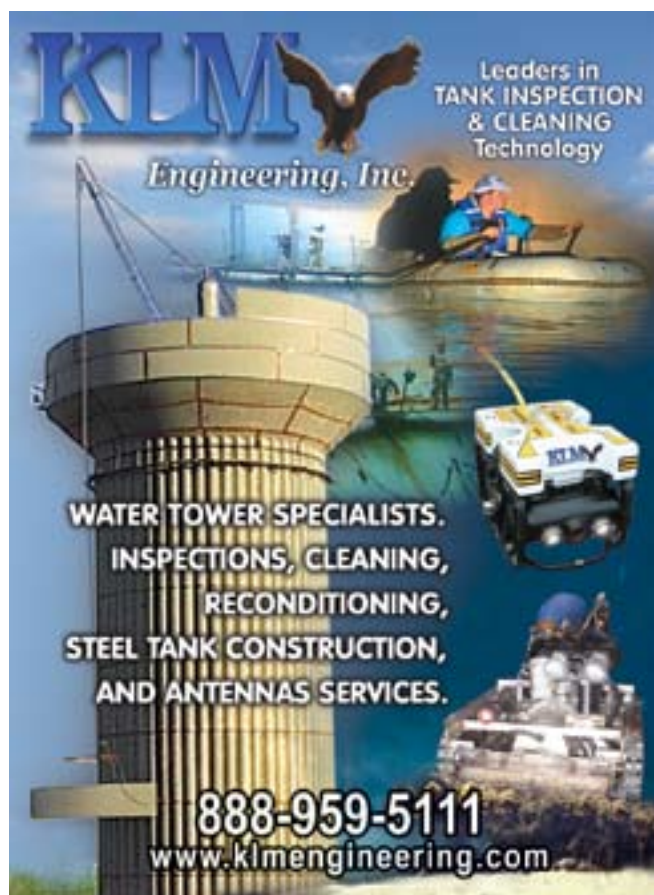
15. Activate YP Committee with meaningful goals.

16. Create internship clearing house matching students with facilities/firms etc.

17. Compile best practices in leadership training (similar to accreditation and leadership academy items above).

**And keep having fun!**

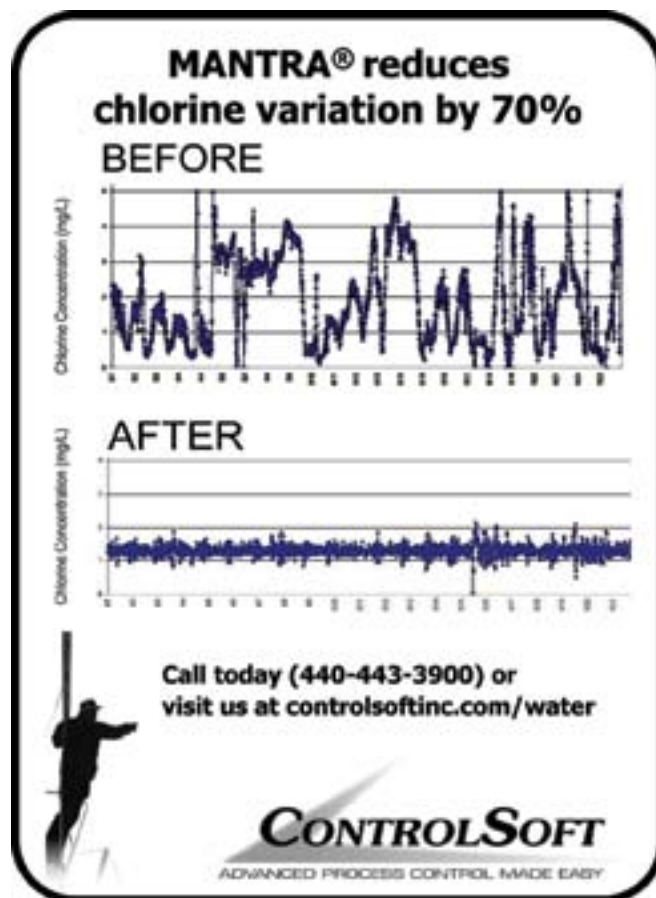
*What a great CSX-YPX! You do not want to miss CSX-YPX '09 scheduled for July 16 & 17, 2009 again at the Kalahari.*



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# Energy and Water

## The need for efficiency

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With the soaring cost of energy, it is obvious that we in the water and wastewater industries must strive to not only become more energy efficient, but to look for opportunities to recover energy wherever possible. In this issue of *Central States Water*, ENERGY has been highlighted with an article on wastewater re-use in the production of ethanol and an article on cost effective technology for the production of electricity from waste digester gas and heat, as little as 200 degrees. Central States is hosting a not-to-miss workshop on Energy Management with USEPA, December 4, 2008 in Madison, again underlining the critical need to focus on energy. The need to promote energy efficiency in the water and wastewater industry has been clearly outlined in a memorandum from Ben Grumbles, Assistant Administrator, USEPA, Office of Water, which is reprinted here.



Ben Grumbles

F E B 1 4 2008  
OFFICE OF WATER

## MEMORANDUM

**SUBJECT:** The Nexus between Water and Energy: Promoting Energy Efficiency for the Water Sector

**FROM:** Benjamin H. Grumbles  
Assistant Administrator

**TO:** EPA Regional Administrators

Reducing climate impacts, saving money, and saving water – these are the goals of recent efforts to identify projects and programs that exploit the nexus between energy use and water infrastructure. As you well know, providing drinking water and wastewater service to citizens across the nation requires energy – and a lot of it! Some studies have estimated that approximately 56 billion kilowatt hours are used for supply and treatment at drinking water supplies and POTWs<sup>1</sup>, the equivalent of approximately 44.8 million tons of greenhouse gas to the atmosphere.

This level of energy use impacts climate change and also costs money. The ENERGY STAR program estimates that about \$4 billion is spent annually for energy costs to run drinking water and wastewater utilities. If the sector could reduce energy use by just 10% through cost effective

investments in energy efficiency, collectively it would save about \$400 million annually.

Agency efforts on water and energy include our broad outreach to promote water efficiency through the WaterSense program, as well as a suite of activities and tools that focus on energy use at utilities. The WaterSense program is helping to identify water efficient products and practices that will help reduce energy needs to treat and deliver drinking water and wastewater. The program has been expanding rapidly and I hope that the Regions can play an expanding role in making WaterSense a household word. If one out of every 100 American homes were retrofitted with water-efficient fixtures, a savings of about 100 million kWh of electricity per year and the avoidance of 80,000 tons of greenhouse gas to the atmosphere<sup>2</sup> would result.

In our work with the water utility industry, we can encourage them to identify approaches to integrate energy efficient practices into their daily management and long-term planning. Practices could include, but are not limited to, promoting benchmarking by utilities so that they better understand how their actions yield results; promoting use of energy efficient products/practices; and evaluating the life cycle energy costs associated with proposed projects so that alternatives can be appropriately considered. Some examples of our efforts by the Office of Water (OW) and our partners include the following:

- An environmental management system (EMS) involves a proven Plan-Do-Check-Act methodology that allows a utility to analyze and reduce the environmental impact of its activities and operate more efficiently. OW has successfully promoted the adoption of EMSs for several years. We are now working with Region 1 on a project to use the Plan-Do-Check-Act approach to reduce energy use at water and wastewater facilities. We have developed a step-by-step workbook entitled "Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities" to help utilities and are holding two workshops in New England, the first of which was on December 11, 2007. A second workshop will be held in March 2008. Several other regions have expressed interest in co-sponsoring similar workshops in 2008. The Water Environment Federation has also expressed interest in sponsoring workshops through their member associations. (Editor's note: CSWEA will host this workshop, December 4, 2008 in Madison) More information will be posted on <http://www.epa.gov/waterinfrastructure/bettermanagementenergy.html>, <http://www.peercenter.net>, and <http://www.energystar.gov>.
- The ENERGY STAR program recently added drinking water and wastewater treatment facilities to the suite of facilities addressed under its Portfolio

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Manager – an interactive energy management tool that can be used to track and assess energy and water consumption. The tool can help a utility to set investment priorities, verify efficiency improvements, and calculate its carbon footprint. The Office of Air and Radiation (OAR) will also be releasing best practices guides that will provide examples of how energy-efficient technologies and practices can reduce energy use and save money. See [http://www.energystar.gov/index.cfm?c=evaluate\\_performance.bus\\_portfolio/manager](http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfolio/manager).

- Increasingly wastewater utilities are realizing that as well as being consumers of energy, they can be generators. Combined heat and power (CHP) is a reliable, cost-effective option for wastewater treatment facilities that have, or are planning to install, anaerobic digesters. Biogas flow from these digesters can be used in a CHP system as "free" fuel to generate reliable electricity and power. OAR and OW worked to develop a guide to

highlight the opportunities and benefits of CHP. See <http://www.epa.gov/chp/markets/wastewater.html>.

- The Municipal Technologies program in the Office of Wastewater Management has developed a number of fact sheets that describe various alternative energy sources that utilities may want to consider for their operations, including solar cells, fuel cells and wind turbines. In the future, the program will be developing energy conservation case studies to highlight the benefits of taking action.


See <http://www.epa.gov/owm/mtb/mtbfact.htm>.

- The Clean Water and Drinking Water State Revolving Funds (SRFs) serve as important sources of financing for drinking water and wastewater infrastructure. The program is currently developing information to highlight how the SRFs can be used to advance energy efficiency.

We are also engaged in projects and research efforts with partners, including

the Water Environment Research Foundation and Center for Environmental Energy Engineering. We want to increase the interaction with regional, state, utility, and stakeholder partners to improve our understanding of potential energy efficiencies and cost savings.

I look forward to engaging with you and your Water Division Directors on this issue and would be interested in hearing your ideas about how we can advance this effort. We have developed a one-stop page to highlight our work in this area at

<http://www.epa.gov/waterinfrastructure/bettermanagementenergy.html>. 

1 EPRI, 2002. *Water & Sustainability (Volume 4): U.S. Water Consumption for Water Supply & Treatment-The Next Half Century*, Electric Power Research Institute, Palo Alto, California, March 2002, Report#: 1006787.

2 EPA calculation. Data sources: Aquacraft Inc, Electric Power Research Institute, and ENERGY STAR.

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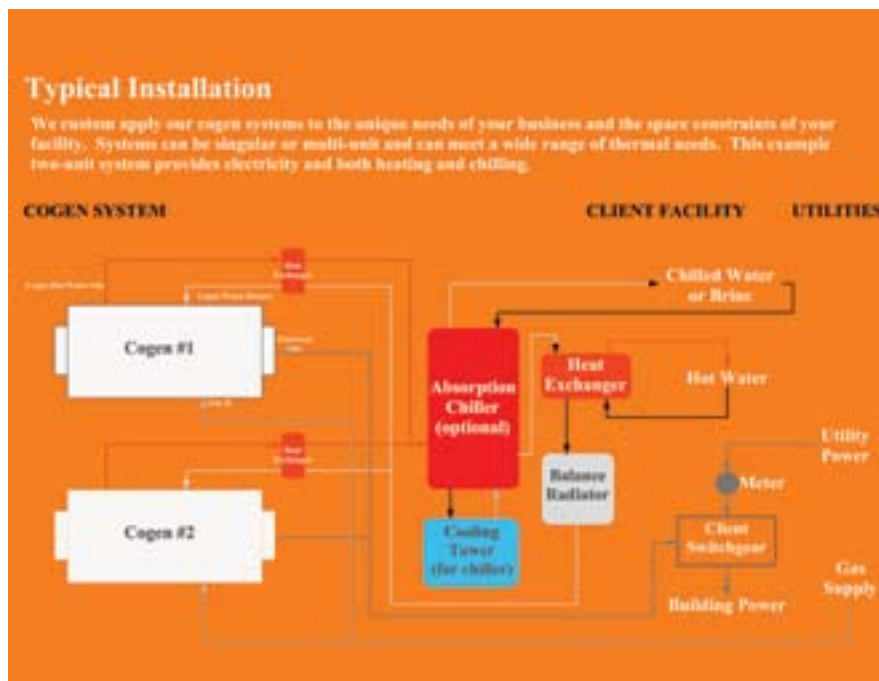


# Renewable Energy in Treatment Plant Operations

By Ray Lecuyer, President ComAp LLC



Typical 300KW CHP set installation (Courtesy Yorkshire Water).



Typical CHP Co-Generation system schematic (Courtesy Stowell Distributed Power).

Wastewater treatment plant facilities offer many renewable energy opportunities with ample sources of digester gas and waste heat for production of virtually free electrical power. Combined Heat and Power (CHP) gas synchronous engine generator sets and waste heat driven turbo expander inductive generator sets are examples of how treatment plant byproducts can be converted to energy. The following brief survey includes examples of each of these renewable energy sources.

Combined Heat and Power (CHP) operations are used by utility districts in the United Kingdom to produce plant electrical power and hot water supply for plant processes. There are approximately 10 major utility districts in the UK that process both clean and wastewater. In England's Midlands, Yorkshire Water operates 30 waste water treatment plants with digesters that provide methane fuel for CHP power plants that range from a single 200KW generator set up to four 300KW sets for a total plant capacity of 1.2MW. Engine waste heat from engine coolant normally expelled through a radiator and from water cooled exhaust is captured and used in plant and digester processes. Electrical power is used both as base load isolated from the grid for plant operations, and can be synchronized with and connected to the grid to augment power from local electric utility suppliers. Key factors for economic feasibility of these operations include cost effective adequate and consistent fuel supply (both quantity and BTU quality), capital equipment costs, operating expenses and a reliable engine/generator and generator/utility control system.

Modern engine/generator controls integrate engine, generator and utility connection in a single controller. The schematic at left depicts engine/

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generator control and protection functions for a single generator paralleled to utility. Advanced engine controls include monitoring of fuel gas quality and air/fuel ratio controls to optimize catalytic conversion of exhaust gas for emissions compliance permitting. Generator protections include over/under voltage, over/under current, frequency, reverse power, voltage regulator control, etc and an auto-synchronizer for paralleling control. All CHP-related functions are controlled by an onboard full function programmable logic controller (PLC) for easy customization to meet specific operational requirements.

More complex examples include multiple CHP sets paralleled together with tie breakers connecting each other and utility interconnections that are used to optimize power management so only required power is generated. Mandated utility side protections per IEEE standard 1547 are included to protect the grid from over/under voltage, current, frequency, reverse power, ground faults, etc. and generally require approval by the local electric utility authority. Web-based remote monitoring and control provides real time billing of actual KWH and BTU usage to capture associated revenue.

Note that a generator controller is associated with each CHP/circuit breaker set and a mains controller is associated with each utility breaker and bus tie breaker.

A second option for auxiliary power generation in water treatment plants makes use of any waste heat source to power a turbo expander driving an inductive generator. Unlike the synchronous generator described earlier, an inductive (or asynchronous) generator produces power when driven faster than the utility frequency and requires connection to utility to operate. Thus,

*continued on page 32*



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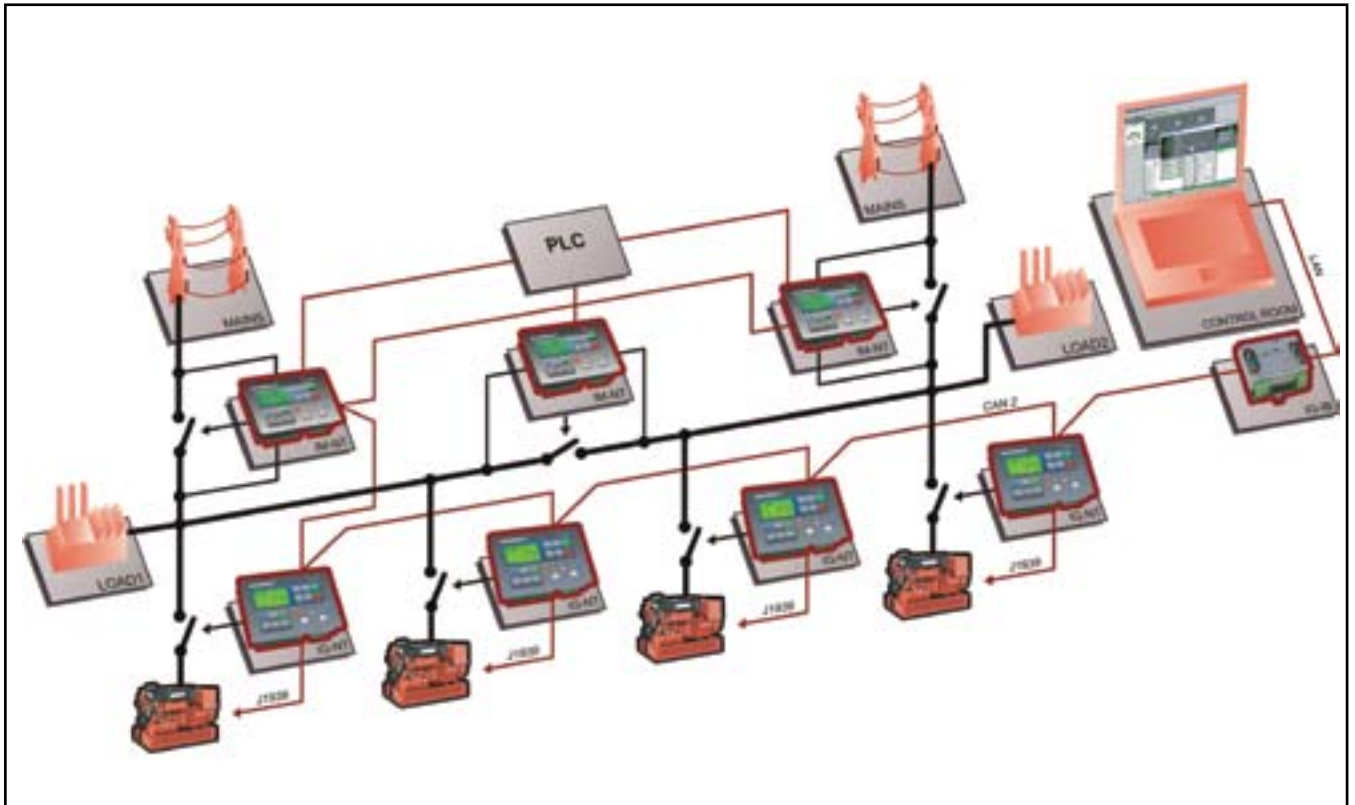
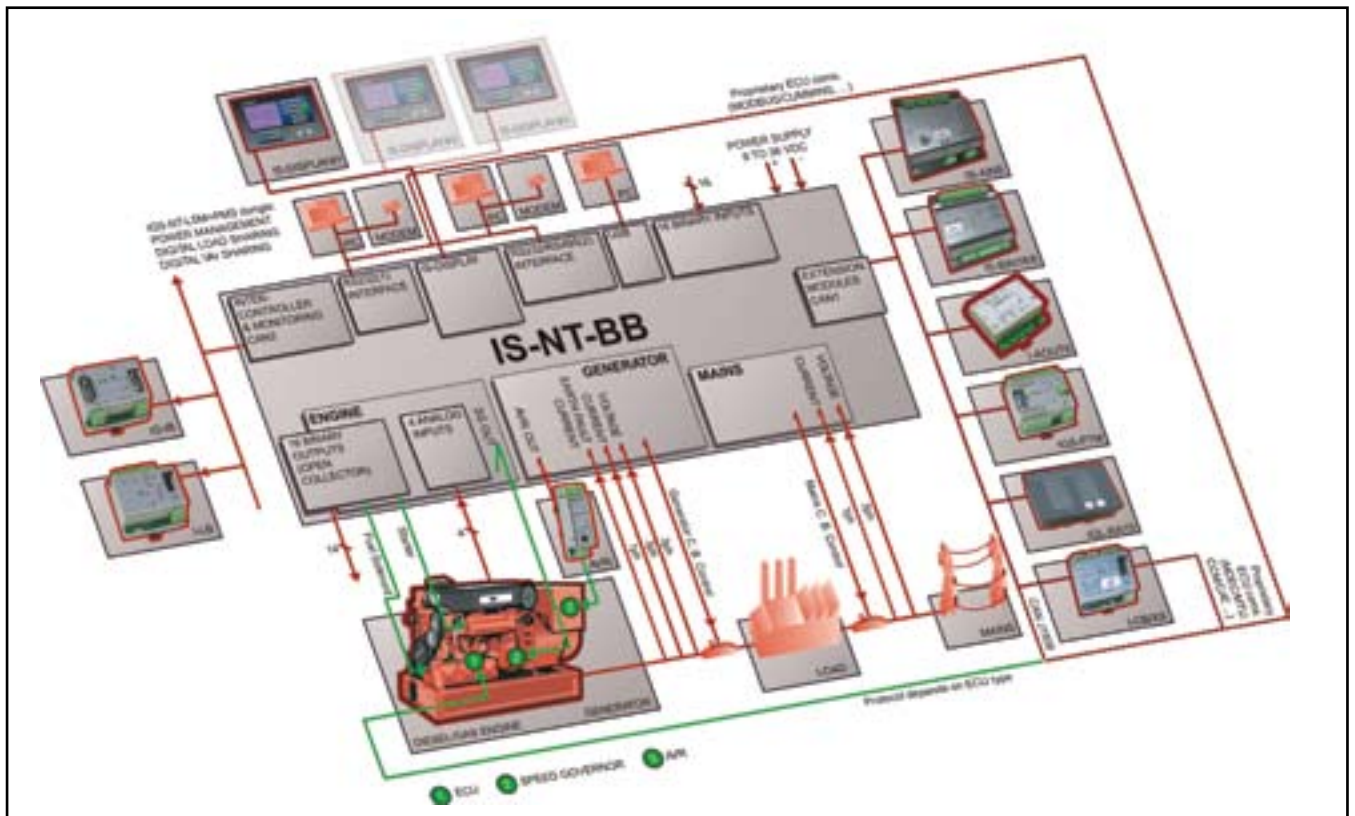
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“Record costs for all forms of energy threaten to cripple our economy and new solutions are needed. Some of those may be right in your waste water treatment plant.”



ElectraTherm 50KW “Green MACHine” at SMU, Dallas, TX  
(Courtesy ElectraTherm, LLC)

inductive generators are not practical for base load (isolated from grid) or emergency stand-by but can be an important source of electrical power that does not require an external fuel source.

Carson City, Nevada based ElectraTherm has introduced a twin screw expander driven inductive generator system that operates on minimal heat, typically 200 degrees F. liquid to generate fuel free, emissions free electricity at very low costs. Any plant operation that includes boilers is an ideal candidate and generator capacity ranges from 50KW to 500KW. The combination of no fuel costs, low capital costs and low operating costs provide fast payback and huge cost avoidance opportunities by reducing utility provided power demand. Control systems are also simplified as no voltage regulation is required and utility side protections are eliminated. Generator speed and load control along with generator and process control functions are provided along with remote monitoring of multiple sets within a plant facility.

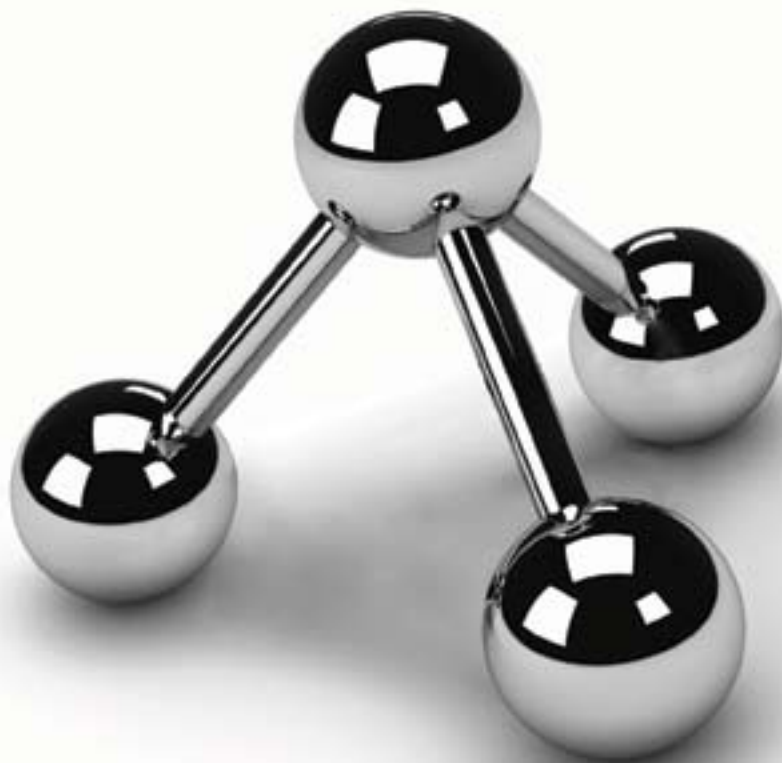
Renewable energy is more than a passing fad; public power generation utilities and distribution grids are already over capacity. New power plants are many years away and demand continues to increase. Record costs for all forms of energy threaten to cripple our economy and new solutions are needed. Some of those may be right in your waste water treatment plant. [CS](#)

*About the author: Ray Lecuyer is President and founder of ComAp LLC, the Roscoe, Illinois based North American distributor for ComAp spol.s r.o. of the Czech Republic. ComAp is a leading supplier of engine and generator controls with locations around the globe. Ray can be reached for comments at [info@comapllc.com](mailto:info@comapllc.com). Check out ElectraTherm. Com for turbo expanders and [sdpenenergy.com](http://sdpenenergy.com) for CHP sets.*



Remote PC monitoring for multiple gen-sets  
(Courtesy ComAp, spol. s r.o.)





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# Upper Midwest Municipality Turns to Wastewater Reuse to Supply Ethanol Plant

**Authors:** Eric C. Dodds, PE, Project Manager, AE2S  
Bruce Grubb, PE, Enterprise Director, City of Fargo

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## Witchin' for water

In the summer of 2006, a new 100 million gallon (MG) ethanol plant was being planned in eastern North Dakota, approximately 25 miles west of the City of Fargo. Siting of the ethanol plant focused on rail access, truck access, crop availability, and power availability, but water supply was not given as much consideration initially. The water supply requirements for the ethanol plant were estimated to range from approximately 790,000 gallons per day (gpd) during winter months to 1.4 million gallons per day (mgd) during warm summer months, with an annual average demand of approximately 955,000 gpd (see Figure 1).

Legislation regarding rural water system boundaries established the right for Cass Rural Water Users District (CRWUD) to sell water to the ethanol plant, because it was sited within the CRWUD service boundary. The water supply for the ethanol plant was pursued from CRWUD and another regional water system, but limited existing water appropriations and limited water supply infrastructure posed significant technical, logistical, and regulatory challenges for the regional water systems. To combat the challenges associated with obtaining a new water appropriation in a quantity-limited, drought susceptible region, ethanol plant leaders approached the City of Fargo in the fall of 2006.

## A concept was born

The City of Fargo is the largest city in North Dakota and holds significant surface water appropriations for its drinking water supply system. Supply

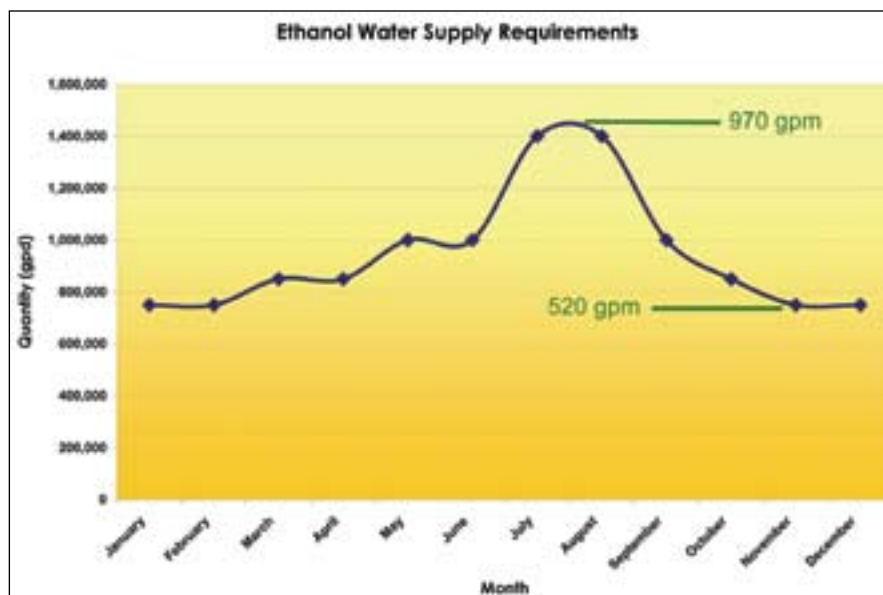


Figure 1

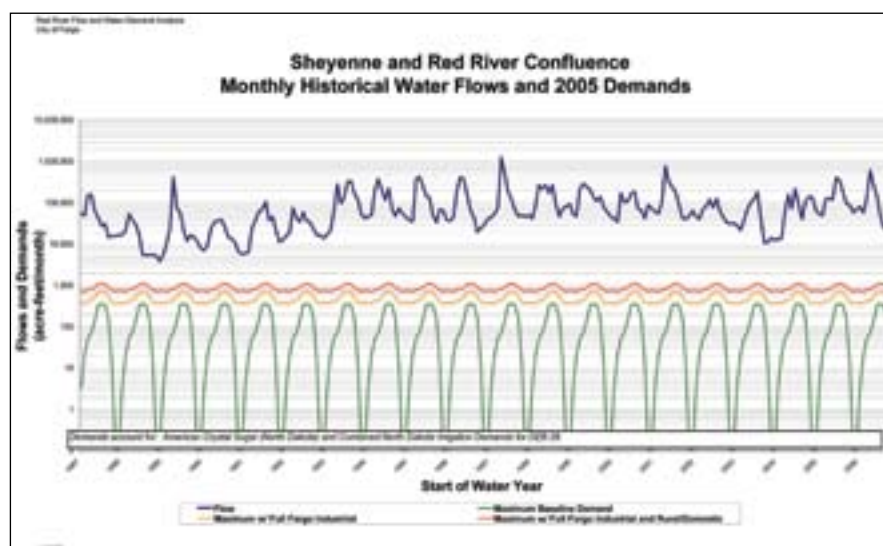


Figure 2

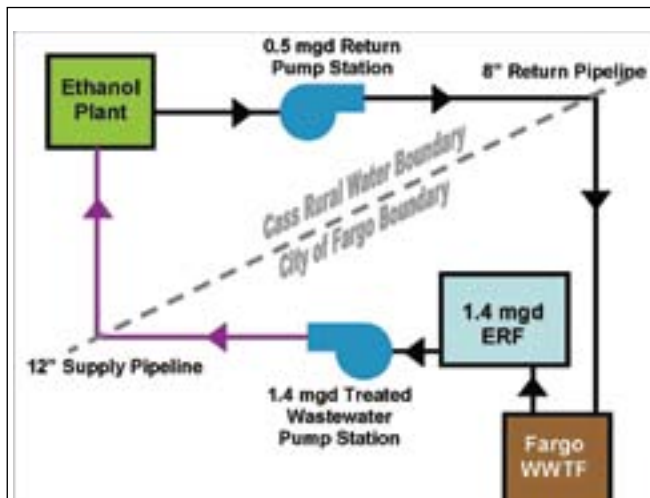


Figure 3: Wastewater Reuse Project Concept

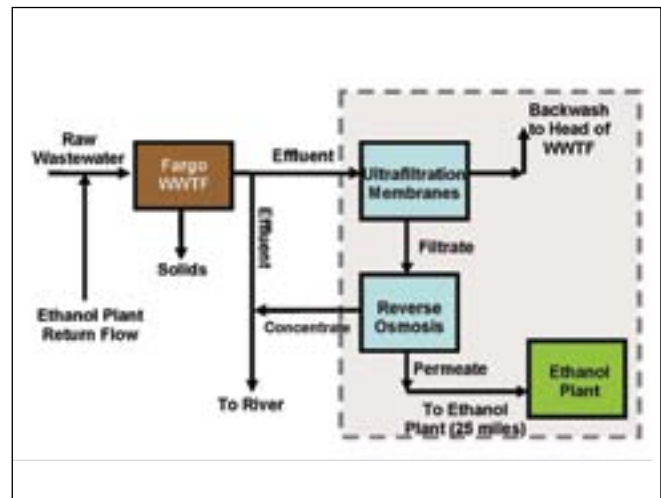


Figure 4: Wastewater Effluent Reuse Facility Process Diagram

from the City's drinking water system, however, presented its own challenges. The City has been working on long-term water supply planning for its own users for years due to concerns associated with drought impacts. In addition, economics of supplying potable water to the ethanol

plant resulted in the determination that the City's potable water supply was not a feasible option for the ethanol plant. Since the City's leaders were excited about the potential revenue associated with water supply to the ethanol plant, the City explored other water supply

options and identified wastewater reuse as a potential alternative. The wastewater reuse concept was attractive to the ethanol plant leaders as it would provide a reliable and high-quality water source for the industry. Work quickly began to define the project requirements.

To ensure that the City could supply water to an industry outside its City limits, the City applied for a point of diversion permit to divert its wastewater effluent away from its receiving stream, the Red River, which serves as the primary water supply source for several downstream communities and industries. To satisfy the North Dakota State Water Commission (NDSWC), an evaluation of river flows compared to water supply requirements was completed. The evaluation concluded that even during times of high demand and low river flows, such as drought conditions in the late 1980s, the volume of water in the Red River exceeded all water supply requirements (see Figure 2). Through this analysis, the NDSWC conditionally approved the City's point of diversion permit and the water supply concept.

#### It takes three to tango

With approval from the NDSWC, the City of Fargo, CRWUD, and the ethanol plant moved forward with the supply water concept. A memorandum of understanding (MOU) between the City of Fargo, CRWUD, and the ethanol plant was drafted to define the project requirements and responsibilities. Early

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in the development of the water supply project, the ethanol plant defined its water quality requirements as indicated in *Table 1*. With this understanding of the water quality requirements, and an estimate of Fargo's Wastewater Treatment Facility (WWTF) effluent (also presented in *Table 1*), it was clear that multiple membrane technologies would be necessary.

As such, it was defined in the MOU that the City of Fargo would operate an effluent reuse facility (ERF) capable of producing 1.4 mgd of reverse osmosis quality water. The City of Fargo will sell reclaimed water to CRWUD, who will in turn sell the reclaimed water to the ethanol plant. It was defined that CRWUD would be responsible for construction of the ERF, while the City would be responsible for providing the WWTF effluent, a site for construction of the facility, and operation of the membrane facility. The ethanol plant will use the reclaimed wastewater in its boiler, cooling tower, and ethanol production process. In addition, the MOU defined that the ethanol plant will send its cooling tower blow-down water back to the Fargo WWTF for treatment and discharge. Fargo and CRWUD will also share responsibility for construction of parallel 26-mile pipelines to/from the Fargo WWTF and the ethanol plant. A schematic of the wastewater reuse project concept is presented in *Figure 3*.

One of the most important parts of the MOU was to define the cost participation for the project. Since the ethanol plant was the sole user of the reclaimed water, they are responsible for the capital cost of the ERF as well as the pumping station and pipelines. Regarding O&M costs, the City of Fargo owns the water resource and will operate the ERF. As such, the value of the water service was defined as \$1.50 per 1,000 gallons, and the cost for O&M of the ERF was defined as \$1.02 per 1,000 gallons. The City will sell the reclaimed water to CRWUD for \$2.52 per gallon, and CRWUD will charge another \$0.40 per 1,000 gallons for pipeline O&M and administrative costs. Since the true O&M costs for the ERF will not be fully defined until after successful operation, the O&M costs are adjustable on a five-year cycle. Additional provisions cover regular water service rate increases as well as large, unforeseen costs associated with major repairs.

### Collaboration plus technology = success

The project design and material procurement was completed with review and input by all three stakeholders. The selected water reclamation process utilizes ultrafiltration (UF) membranes followed by reverse osmosis (RO) membranes to meet the water quality and quantity requirements of the ethanol plant. A process schematic is presented in *Figure 4*.

Effluent from the Fargo WWTF will enter a wet-well in the ERF where it will be pumped through strainers and four UF membrane skids. The UF backwash will be directed to the WWTF headworks through an adjacent gravity sewer. The UF filtrate will discharge to a second wet-well where it will be pumped to three RO membrane skids. The RO concentrate will be blended with the WWTF effluent stream prior to chlorination and then discharged to the receiving stream. The RO permeate



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Table 1: Water Quality Parameters – Minimum Supply Requirements and Estimated WWTF Effluent Concentrations

Parameter	Minimum Water Supply Quality	Estimated Fargo WWTF Effluent
Chloride (Cl <sup>-</sup> )	≤ 10 ppm	90 – 120 ppm
Calcium (Ca <sup>2+</sup> )	≤ 10 ppm	60 – 85 ppm
Hardness (as CaCO <sub>3</sub> )	≤ 10 ppm	300 – 500 ppm
Silicon (SiO <sub>2</sub> )	≤ 3 ppm	5 – 8 ppm
Biochemical Oxygen Demand (BOD <sub>5</sub> )	≤ 2 ppm	5 – 15 ppm
pH	7 - 8.5	7 – 8

will discharge to a clearwell where high pressure pumps will pump the reclaimed water to the ethanol plant. The cooling tower blow-down water will be returned from the ethanol plant to the WWTF headworks. Chemicals used in the process include chloramines to protect against bio-

fouling of the membranes, anti-scalant for membrane protection, and strong and weak acid solutions for membrane cleaning.

This project showcases the existing outcomes that resulted from an industries need for a high quality water supply for a new industry, combined with the City's

productive approach, collaboration with CRWUD, and advanced water reclamation technologies. The emergence of membrane technologies for treating wastewater effluent is a cornerstone in the success of this project that will help bring economic development to the region. [CS](#)

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# Submit for an Award

By Rusty Schroedel

**A**ll too often, we in the wastewater and water quality industry bemoan the fact we are invisible to the public until there is a problem. We feel unappreciated and taken for granted. One easy way to help address this issue is to submit a nomination in the WEF and Central States awards program. We often undervalue the important tasks we perform as part of our daily activities. Whether in design, academia, equipment manufacture and supply, management, or operations, many of us know individuals



who have successfully addressed unique and challenging issues. I'm guessing all of us know someone we believe is deserving of recognition. Our awards program offers that opportunity.

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 awards available and nominate one of our many deserving members.

## 2008 CSWEA & WEF Award Nominations Now Being Accepted

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

### Charles Alvin Emerson Medal:

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

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

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

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

**Gordon Maskew Fair Medal:** This award is presented by WEF and recognizes worthy accomplishments in the training and

development of future sanitary engineers. Nominee must be a WEF member.

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

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

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

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

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

**Member Association Safety Award:** This WEF award is presented to a member association to recognize the



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success of the safety programs in their local wastewater works.

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

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

**Operations Award:** The Operations Award is a Central States award that is given annually to one recipient in each state. The purpose of this award is to recognize operators of wastewater

treatment facilities who are performing their duties in an outstanding manner and our demonstrating distinguished professionalism. The State Sections' Committee makes the nomination.

**Radebaugh Award:** The Radebaugh Award is given to the author of a deserving paper presented at the previous year's annual meeting. The Radebaugh award subcommittee selects the nominations.

**Academic Excellence Award:** The Academic Excellence Award is given to one student per year from each eligible institution in the state section hosting the Annual Conference (Minnesota is hosting the next conference.). An eligible institution shall be a college or university having a recognized graduate or undergraduate program in engineering as accredited by the Accreditation Board for Engineering and Technology. The candidate shall be selected by the Department Chairman or other designated person at the eligible institution.

**Collection System Award:** This Award is given to one member each year in recognition of outstanding contributions in advancing collection system knowledge and direct or indirect improvement in water quality. Each State Section Collection System Committee can nominate one individual per year. The recipient of the Association Award shall be nominated annually for the WEF Collection System Award.

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

**Central State Section Safety Award:** The CSWEA Facility Safety Award is made annually by CSWEA to a municipal or industrial wastewater facility within each State Section in recognition of active and effective safety programs from Burke Award submissions

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

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

**Industrial Environmental Achievement Award:** The award is given to one industry per year in recognition of outstanding contributions in waste minimization, pollution prevention, environmental compliance and environmental

**CSWEA Outstanding Educator of**

**the Year Award:** This award is given to one teacher per year in recognition of outstanding education assistance to students of any level in the study of the water environment.

**CSWEA Outstanding Young Professional Award:** This award recognizes the contributions of young water environment professionals for significant contributions to CSWEA and to the wastewater collection and treatment industry. [CS](#)

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



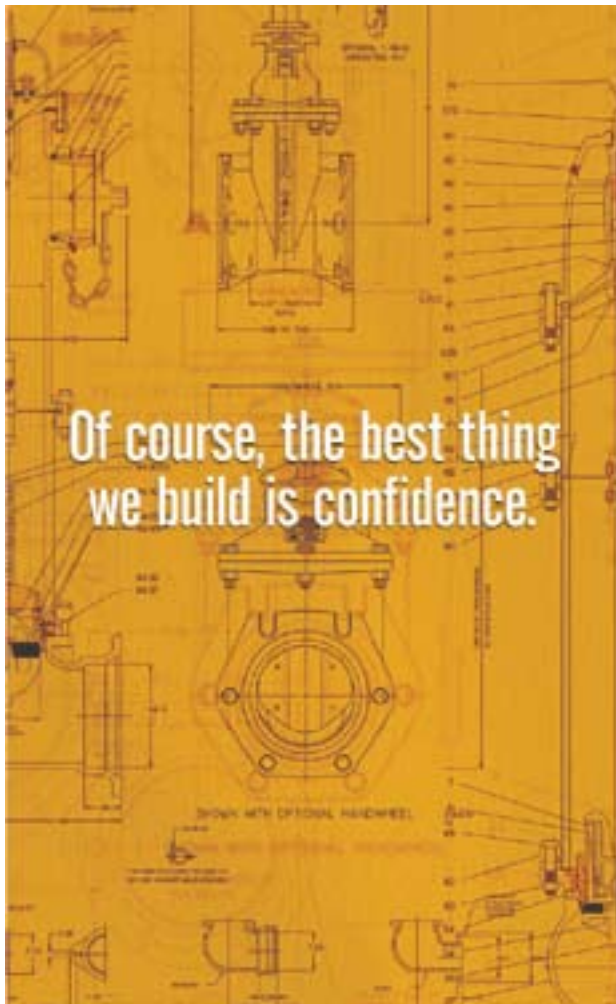
**(Cut and return)**

Please complete the following information and submit to Rusty Schroedel at [rusty.schroedel@aecom.com](mailto:rusty.schroedel@aecom.com)  
Nominations must be received no later than November 1, 2008 for consideration as the Central States WEA Nominee for each award category.

Award Name: \_\_\_\_\_  
Nominee: \_\_\_\_\_  
Nominee Contact Information:  
Employer Name: \_\_\_\_\_  
Phone #: \_\_\_\_\_  
Email address \_\_\_\_\_  
WEF member ID \_\_\_\_\_  
Other: \_\_\_\_\_

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

Please provide your Name: \_\_\_\_\_  
*(it's OK to nominate yourself!)*  
Contact info:  
Phone # \_\_\_\_\_  
Email address \_\_\_\_\_  
Other: \_\_\_\_\_



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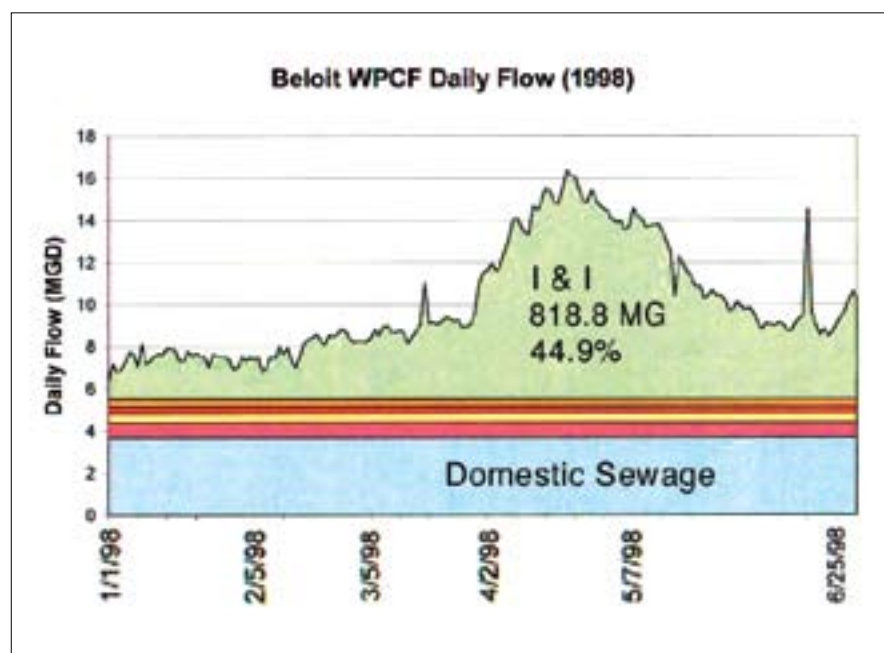


# CITY OF BELOIT SANITARY SEWER REHABILITATION SUMMARY

By Steve Woodman

**T**he City of Beloit has a chronic problem with high Rock River levels causing high groundwater infiltration in the floodplain area. In 1992 the city began aggressive televising of the sewers to address this and other sewer-related problems. In 1998 a large leak was discovered between the effluent return sewer and a crossing interceptor. This leak was corrected with a CIPP liner in 1999 that reduced recycled flow by about 0.5 MGD. Additional televising and manhole inspections of the downtown sanitary and storm sewers found many more I&I sources.

A large budget was prepared in 2000 for the contracted sewer rehabilitation and flow monitoring of the sections of the system that remained as sources of high infiltration. Inflow problems will be addressed later when the infiltration is substantially reduced.



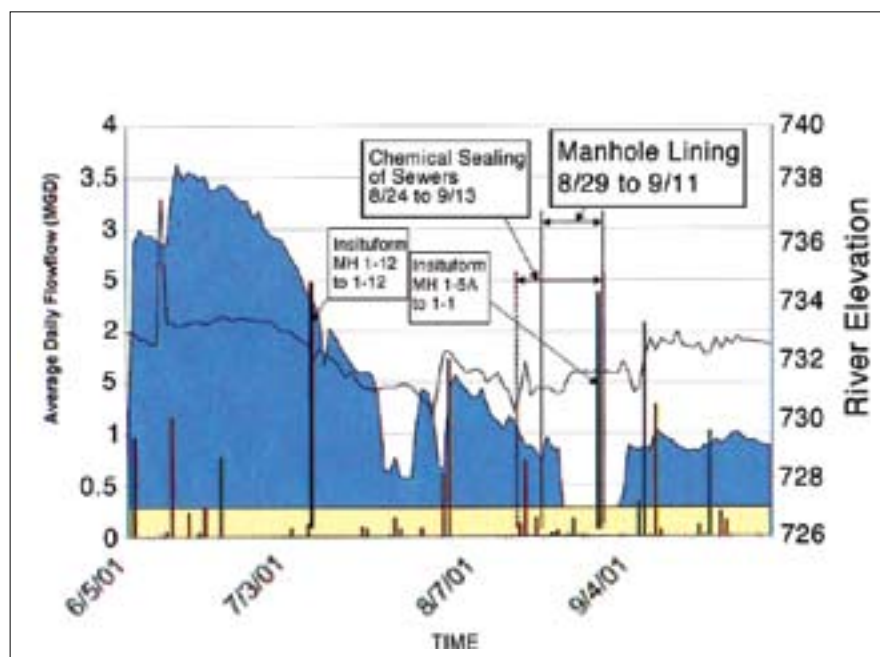


A CIP project was designed in 2001 for mostly conventional open cut rehabilitation that a local contractor could bid on with little subcontract work. A second CIP contract was designed for mostly "trenchless rehabilitation" that more than likely would be bid by out-of-town specialty contractors. Heavy emphasis was placed on inspection, flow monitoring, and material quality control.

A common sense approach was used in doing the least costly rehabilitation that eliminates the highest amounts of infiltration first, and then doing the more expensive and less effective work later. This approach has been used in these two projects and in the projects completed in the many years since. Also, only the manholes and sewers lying below the yearly high river level will be attacked first. The following rehabilitation and flow monitoring has been done to date:

1. Eliminate all unused sewers by simply installing bulkheads in manholes.
2. Eliminate all unused private services by grouting them with up to 20 gallons of latex modified chemical grout.
3. Grout all leaking private sewer wye caps with latex modified chemical grout.
4. Grout all visible leaks in manholes prior to a one inch thick cementations (8,000 PSI) liner.
5. Abandon as many manholes as you can where they are not needed.
6. Test and chemically seal joints in all sewers with good pipe but with leaky joints.
7. Install CIPP liners where there are structural and infiltration problems.
8. Reconstruct manholes that are too degraded to rehabilitate.
9. Reconstruct sewers with bad grade problems as well as high infiltration.
10. Chemically grout the lateral connections and as a minimum the first four feet of the laterals.

The sewer rehabilitation over the past nine years has resulted in the reduction in average daily flows by about 50%. The anticipated rehabilitation of a badly leaking 48-inch (1973) interceptor in 2009 is expected to reduce wet weather flows by another 1.2 MGD. The flood levels seen this year caused ground water levels to go far beyond the levels seen in the past and caused the flows at the treatment plant to reach 18 MGD, a threefold increase. Basement flooding was the primary cause but many additional leaks were found in the rehabilitated area requiring another round of rehabilitation



to a much higher groundwater elevation. It is recommended that one rehabilitate sewers near rivers and creeks to an elevation equal to the 100-year flood level.

Televising both the sanitary and the storm sewers in all sewers located below the groundwater table is the first step to identifying infiltration and structural deficiencies in sewers with chronic infiltration. Sewer rehabilitation using the tools we have today and with

proper inspection and material quality control will get you well on your way to minimizing the impact of infiltration on your treatment facility.

**Note:** Beloit has a conventional activated sludge plant that is removing Phosphorus to around 0.5 mg/l on a regular basis. Our limit is 2mg/l because we are considered a biological plant since we do not add chemicals to remove phosphorus.

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To effectively remove "P" one must have a strong sewage (30:1) and the removal of the infiltration reduces the dilution effect thereby enhancing the strength of that ratio.

The Beloit plant was constructed 2.5 miles to the East of the former site at an elevation about 70 feet higher than the old plant. All sewage must be pumped to the plant. Substantial savings in electrical cost have been realized due to the reduction in flow to the plant due to the removal of infiltration. CS

Author Steve Woodman is the WRD Staff Engineer for the City of Beloit, WI and the 2008 CSWEA Outstanding Collection System Award winner.



Temporary permitted overflow used to facilitate sewer rehabilitation.

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# ***Safety:*** For You and Those Who Need You Tomorrow

By Gary B. Scott, CPMM

**R**ecently I was thinking about why we can't seem to create and sustain superior safety performance in our industry. Is it that we treat safety as that subject we talk about but don't speak to? Are we developing safe practices as a part of a work culture by communicating clear vision and expectation to our workforce? While thinking and planning for your upcoming fall operations and maintenance tasking ask yourself: Have we failed to define these roles and responsibilities as they relate to safe work practices and performance at all levels of our organizations? If the answer is no, then we are failing in our leadership commitment to our most valuable asset to ensure each worker will spend the evening with his family or loved ones.

*continued on next page*





You have to look deep inside your organization, start talking about what is right for yourself, group, specialty, and organizational make-up to begin to develop a new safe work culture.

Oftentimes organizations opt to a cookbook remedy that, if followed, will allow managers and front-line supervisors to create the illusion of the accident-free workplace by following those step-by-step procedures some educated persons sell as a package. Come on, admit it. You've seen the promotions, maybe even considered them. I'm of the belief that no cookie-cutter philosophy works everywhere. You have to look deep inside your organization, start talking about what is right for yourself, group, specialty, and organizational make-up to begin to develop a new safe work culture.

Over the past five years of so, we have all seen efforts and initiatives to involve staff in the improvement of safety performance. This usually prospers into a rather new form of show and tell, for the lack of a better description. One employee observes unsafe behavior, reports it to a safety committee, it is reviewed and new policies and procedures are developed all in the hope it will lead to safer work practices or remove unsafe behaviors by staff. Sure it works this way sometimes, but it generally can't stand the test of time.

You may have experienced the carrot-and-stick methodology related to safety performance. Good performance is recognized through financial incentives, safety product give-aways, and award banquets. Poor performance is met with loss of pay, disciplinary action, and even termination. Neither positive nor negative consequences appear to have long-lasting impact or improve long-term safety performance.

So just why can't we as an industry sustain superior performance? Have you

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identified your organizational beliefs on safety? Does leadership convey a clear vision and expectation? How is your safety performance measured? Do you understand the consequences of safety performance, positive and negative? Are the safety roles of individuals who report to you, and for that matter your responsibilities communicated up and down the line? Are you and they committed to these responsibilities? The answers to these questions may surprise you, especially if grouped by organizational levels.

#### Assessment leads to safe practices

So how is the safety performance in your organization? To really find out you better strap on the PPE and check out what is really going on. As you wander through your facilities, pay close attention to the basics. What is the overall condition? Is it as clean and well lit as you expected? Are spills and leaks evident? If equipment is tagged-out for repair, how long has this existed? Is staff working in a safe manner? Once you have identified unsafe practices, now what?

#### Proper planning increases safety

Have you identified job plans for tasking staff is ordinarily pursuing, and those non-routine tasks, are they planned as well? Are chemical hazards and lock-out procedures identified associated with job plans? How about the PPE and tools needed? Multi-craft coordination should be identified. Do you know the proper staff requirements to complete the work safely? Are parts and materials readily available, if not plan interim safety precautions and communicate these conditions pending completion of the work.

#### Work schedules effect safety

Proper planning is only the first step in safe execution. We all feel the stress of the emergency corrective work which needs done. But if we adopt the discipline to schedule and assign properly planned work, the resulting safe practices lend support to a culture which staff can buy into, and decrease unsafe work practices. Most agencies become expert in emergency, reactive, and just-in-time work as a result of pressure to do more with less. Scheduling well planned work identifying requirements, tools, equipment, coordination, and proper safe isolation of hazards can and will result in accident and injury prevention.

#### Work accomplishment builds positive safety culture

By documenting all safety problems or deviations for inclusion into revised job plans we build on the safe culture received from the fruits of our safe work practices. The information gathered during these job plan revisions lead to fewer unsafe practices in the future. Clear, concise expectations of the work to be completed generally yield less and less misinterpretation, and a safer work environment for our staff. We build upon the safe work environment with conscientious performance based recognition and it yields proactive safe

attitudes among staff. Ones thought process might be "My work is planned with safety in mind, I'm safe while working, I care about my work, the organization cares about me, and I care about the safety culture." Build, build, and build that self-actualized safety culture.

#### Agency recognition

Now that you have achieved, show the staff you believe your program reaches for the stars. The WEF **George W. Burke Jr. Facility Safety Award** was established in 1982 in recognition of active and effective safety programs in municipal and industrial wastewater treatment facilities.



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This prestigious award recognizes a single treatment facility within CSWEA based on both the documented safety program and illustrated safety record of the facility for the preceding calendar year. To be eligible for this award, at least one (1) employee of your facility must have CSWEA member status. Success should be recognized and celebrated by our agencies based on their specific circumstances and achievements. Burke Award submission details are announced beginning in October. Watch the CSWEA website for details at [www.cswea.org](http://www.cswea.org) for details.

In conclusion, each of our staff has a vital role in the process of protecting and sustaining the environment. We must get back to the basics. We must as leaders should define safety as a basic step in our management process. Make everyone see the importance and reward of a safe work experience. Make safety an everyday occurrence, as common as the breath we take without much thought. Avoid the temptation to make safety an event, instead make safety the way we live our work life. Remember, there are others who need us tomorrow ...work safely today for them too. **CS**



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# Certification Corner

By Dennis Lindeke

Operators, test your water and wastewater knowledge.

**1. Given the following, what is the primary clarifier BOD and TSS removal efficiency and what is the total plant BOD and TSS removal efficiency?**

	BOD	TSS
Influent	225 mg/l	238 mg/l
Primary Effluent	153 mg/l	114 mg/l
Plant Effluent	4 mg/l	5 mg/l

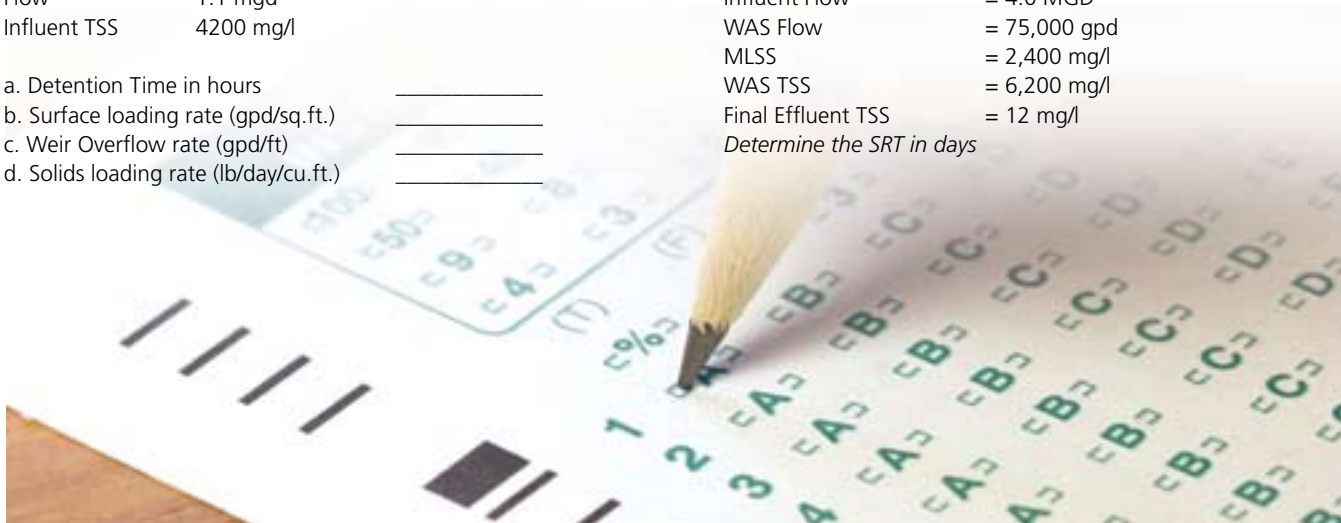
**2. Given the following data on a final clarifier, calculate:**

Diameter	60 ft
Depth	12 ft
Flow	1.1 mgd
Influent TSS	4200 mg/l

- Detention Time in hours \_\_\_\_\_
- Surface loading rate (gpd/sq.ft.) \_\_\_\_\_
- Weir Overflow rate (gpd/ft) \_\_\_\_\_
- Solids loading rate (lb/day/cu.ft.) \_\_\_\_\_

**3. Given:** Influent Flow = 4.0 mgd  
 Primary Effluent BOD = 100 mg/l  
 Aeration Tank = 100' long x 45' wide x 16.5' deep  
 MLSS = 2,700 mg/l  
 Determine the F/M Ratio

**4. Given:** Aeration Tank  
 Volume = 1,000,000 gallons  
 Final Clarifier Volume = 500,000 gallons  
 Influent Flow = 4.0 MGD  
 WAS Flow = 75,000 gpd  
 MLSS = 2,400 mg/l  
 WAS TSS = 6,200 mg/l  
 Final Effluent TSS = 12 mg/l  
 Determine the SRT in days



**Answers:** 1. (a) 32% BOD, 52% TSS (b) 98.2% BOD, 97.9% TSS 2. (a) 5.5 hrs (b) 389 gpd/sqft (c) 5,839 gpd/ft (d) 1.14 lb/day/cuft 3. 0.27 4. 7.02 days

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# Step Up

Steve Godfrey

As I write my second Chair's message the nights are getting cooler, school busses are back on the road and our beloved Brewers are literally stepping to the plate to make a run for the MLB playoffs (at least they were when I wrote this). These are all signs that our much too short summer is coming to and end. It was not only a short summer, but it was an unusual one also.

If you travel across Wisconsin you can see a mud flat that once was a lake, waterfowl swimming in ponds that should be cornfields and brown rivers still running at near-flood stage levels. These reminders of the devastating June rains in many parts of our state certainly demonstrate the impact nature can have on our water environment. This coupled with water supply shortages, changing effluent standards, TMDLs and a myriad of other hot environmental issues only underscore the importance of our organization's mission.

At our summer board meeting we adopted an updated strategic plan focusing on strengthening student chapters, involvement of the Young Professionals group, increased public outreach and education, encouraging member participation and improving the effectiveness of all of our committees. As a result of the efforts and dedication of many of our members, our Wisconsin Section is definitely realizing the positive effects of following the strategic plan that was initiated six years ago. We have a great group of talented people on our committees



now and with the updated plan we are definitely headed in the right direction.


Our YP group, under the leadership of Rachel Lee and Trevor Ghylin, has several educational and social activities planned with our student chapters, including WWTP tours and a repeat of last year's successful Brewers game outing with the seasoned professionals. Dale Doerr's Public Education and Awareness Committee is putting together a program for our section's promotion of World Water Monitoring Day. We are very happy that Jay Kemp has stepped forward to chair the Membership Committee and is looking for members to help him

revitalize this important committee. I don't have room in this article to recognize all of the individuals that work to make this a great organization work, but their efforts are greatly appreciated.

We have our mission, our goals and a plan, and it does take some effort and commitment to make it work, but there is no better way to promote our profession than to be involved in our Section's activities. It is an opportunity to share your skills and knowledge, meet new friends and have a lot of fun along the way. The more people we have on the team, the easier the task becomes (and it makes for a better party). Take a tour of the Wisconsin Section's pages of our website at [www.CSWEA.org](http://www.CSWEA.org) and get a better understanding of what we are all about. Hopefully you will like what you see and decide to take your turn and step to the plate and get more involved with the organization. *Batter up! CS*

“I don't have room in this article to recognize all of the individuals that work to make this a great organization work, but their efforts are greatly appreciated.”

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# Recent Minnesota Activities

Doug Henrichsen

The MN Section has been very active over the last few months planning, organizing, and attending our special events. Some of our recent activities included:

The MN Section CSWEA/MWOA **Laboratory Training Seminar** was held in St. Cloud, Minnesota on June 18-19, 2008. The general topic for the seminar was "MDH Rules from the Laboratory Perspective". The seminar focused on several issues specifically highlighted to the laboratory, which included: recent laboratory certification requirements, updates to standard operating procedures, laboratory SOPs, laboratory QA/QC procedures, personnel training, quality control for chemistry, quality control for bacteriology, MDH regulatory updates, and other important laboratory topics. Marion Graham, Patti Mettler, Mary Ann Baumgart, and others worked hard to provide a great seminar, which was well attended.

Several members from the MN Section attended the **CSWEA CSX Meeting** held July 17-18, 2008 at the Kalahari Resort in Wisconsin Dells, Wisconsin. This meeting was well attended by representatives from all three states and the CSWEA Executive Committee. The CSX meeting provided a great means for exchanging ideas between the various committees, sections, and CSWEA. Several Big Ideas, strategies, goals, and young professional activities were put forth to continue providing our message to the communities we serve.

The **MWOA 32nd Annual Conference** was held July 22-25, 2008 in Mankato, Minnesota. Keith Redmond, MWOA President, and John Brady, Mayor of Mankato, provided the welcome to conference attendees. The keynote speaker was Mark Seeley from



the University of Minnesota, who gave a talk on current climate change issues. A general session, along with several technical sessions (biosolids, collection system, facility upgrades, management, and other topics), were provided throughout the duration of the conference. This conference was also well attended.

Several upcoming events for the MN Section are currently in the planning stages. Upcoming events for the MN Section include:

- October 14, 2008 CSWEA/MWOA Collection System Workshop, Duluth, MN
- November 6, 2008: MN Section CSWEA/A&WMA Conference on the Environment, Earle Brown Heritage Center, Brooklyn Center, MN
- February 24, 2009. MN Section CSWEA/MWOA 25th Annual Innovative Approaches to Wastewater Operational Problems Seminar, St. Cloud, MN

***Please save these dates on your calendar for these important events.***

Chair positions still needing to be filled include the Biosolids and Government Affairs committees. Several candidates have already been identified, so if you wish to be the leader of one of these important committees, please get your name in as we will most likely vote to fill these positions at our next meeting in November at the Conference on the Environment. To learn more about these opportunities or to join a committee, please visit our website: <http://www.cswea.org/minnesota>. This site also includes a listing of all current committees and chairs. [CS](#)

*"The CSX meeting provided a great means for exchanging ideas between the various committees, sections, and CSWEA."*

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# Attend a Section Seminar

Roger Gyger

The last few months have been quite active within the Illinois Section. Technical seminars were held for collection systems, laboratory activities and plant operations. The collections system seminar was held in DeKalb, Illinois at the Park District Conference facility. We had eight presenters, including manufacturers, consulting engineers and utilities, who covered a wide variety of current collections systems issues. The laboratory seminar was held at the Crystal Lake, Illinois training facility. The presenters provided an array of information on state-of-the art laboratory equipment and techniques. This seminar was sponsored jointly by the Illinois Section and IWEA. The operations seminar was held at the Fox River Sanitary District main plant. Eight presenters offered a variety of perspectives on new operating and design techniques for optimizing the efficiency and effectiveness of existing treatment facilities.

All three of these seminars were well attended by enthusiastic participants and were an educational and fiscal success for the Illinois Section. We have begun implementing our approach for posting the seminar proceedings on the Illinois Section portion of the CSWEA website and the presentations from the collections, laboratory and operations seminars are currently posted at [www.CSWEA.org](http://www.CSWEA.org). Special thanks go to Mark Eddington from Trotter Associates, Sue Baert from the Wheaton Sanitary District and Steve Bollweg from the Wheaton Sanitary District who were responsible



for the collections, laboratory and operations seminars, respectively.

In keeping with our objective to develop and strengthen relationships with other organizations, an initial meeting was held with two incoming officers of IWEA to explore avenues for collaboration between the Illinois Section and IWEA. The joint laboratory seminar was a good example of the collaborative seminar approach. The joint Illinois government affairs seminar has also proven to be a mutually rewarding event and it will be continued. The dialogue with IWEA will continue through the year.

We continue to promote The *Water Is Life* program at all of the Illinois Section events, including a table-top display and various hand-out materials. We are currently soliciting endorsing utilities within Illinois.

We would like to welcome our new Laboratory Chairperson, Mary Dressel, from the Downers Grove Sanitary District. Many thanks to Sue Baert for her many years of leading this important committee and the great successes the committee has achieved.

The Illinois Section will be participating in World Water Monitoring Day and we have purchased a supply of test kits and are currently planning distribution to schools and affiliated groups.

We are looking forward with great anticipation to this year's WEFTEC in Chicago. CSWEA and IWEA will be jointly hosting the WEFTEC Welcome Booth. Be sure to stop by the Welcome booth and say hi, as part of your visit to WEFTEC '08. [CS](http://www.csw.org)





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## SEPTEMBER

- 9-10** USEPA Asset Management Workshop, Hosted by CSWEA, Monona Terrace, Madison, WI
- 18** CSWEA Young Professionals Educational Event hosted by Symbiont  
Symbiont Headquarters, Summit Place  
6737 W. Washington Street  
West Allis, WI 53214

## OCTOBER

- 14** MN Section CSWEA/MWOA Collection System Workshop, Duluth, MN
- 18-22** WEFTEC '08, Chicago, IL
- 19** CSWEA/IWEA Welcome Reception at WEFTEC '08 Sheraton Chicago Hotel and Towers  
Chicago, IL

## NOVEMBER

- 12** IL Section CSWEA Maintenance & Safety Seminar  
City of Naperville – Safety and Training Facility
- 6** MN Section CSWEA 23rd Annual Conference on the Environment ,Earl Brown Heritage Center,  
Brooklyn Center, MN

## DECEMBER

- 4** USEPA Energy Management Workshop hosted by CSWEA, Monona Terrace, Madison, WI

## FEBRUARY 2009

- 24** MN Section CSWEA/MWOA 25th Annual Innovative Approaches to Wastewater Operational Problems Seminar, St. Cloud, MN

## APRIL 2009


- 7** 14th Annual, CSWEA Education Seminar  
Monona Terrace, Madison, WI

## MAY 2009


- 18-22** 82nd CSWEA Annual Meeting  
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## JULY 2009

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# The Benefits of CSWEA Membership

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*You will benefit personally and professionally by joining the **CSWEA**:*

- By keeping current on technical developments.
- By keeping current on regulatory developments.
- By networking with like professionals.
- Gain sales and marketing contacts by advertising, exhibiting and one-on-one contacts.
- Enhance relationships with regulatory agencies, and their personnel.
- Create opportunities to make a contribution to more effective water environment activities.
- Take advantage of opportunities for publication in our magazine **Central States Water** as well as WEF publications.
- Learn and practice leadership by becoming an officer, serve on association and state section boards, committees, etc.
- Opportunities to present papers at state section and association (three-state) conferences and seminar.
- Social interaction with all environmental professionals involved.
- Opportunities for cost-effective continuing and advanced education for both professional engineers and operator recertification.
- Support by people engaged in like activities.
- Gain professional recognition and personal development.





# Goals

The objectives of **CSWEA** are to:

- Advance the fundamental knowledge of the water environment, its basic qualities, and physical laws governing its interaction with other aspects of the environment and with the aesthetic, economic and biological needs of the earth's inhabitants.
- Advance the knowledge and technology in the design, construction, operation and management of water quality systems and facilities.
- Increase the knowledge and understanding of the earth's water environment, and encourage and promote action necessary for its enhancement.
- Develop and implement effective delivery mechanisms to rapidly disseminate knowledge concerning the water environment to members and other interested parties.
- Promote sound policy in matters relating to the water environment.
- Improve the professional status of all personnel engaged in any aspect of

protecting and improving the earth's water environment.

- Strengthen and build alliances with organizations throughout the world incorporating members of all professions dedicated to the preservation and enhancement of water quality and water resources.
- Stimulate public awareness of the relationship of water resources to the public welfare and the need for pollution prevention, resource recovery, preservation, conservation, and reuse of water resources.
- To provide a regional (Illinois, Minnesota, Wisconsin) organization offering multiple opportunities for the exchange of water environment knowledge and experiences among its members and the public and to foster a greater awareness of water environment achievements and challenges.
- Serve the international community of water environment professionals.
- To support and encourage activities and programs within the three states as developed by the members and committees of the state sections.

## Networking opportunities

**CSWEA** activities allow members to establish contacts within their communities, whether facility operators and managers or consulting engineers and ask for counsel and advice on work situations in the water environment field. Attending association functions can provide members with career opportunities.

## Our members

**CSWEA** members include civil, design and environmental engineers; biologists, chemists, local and state government officials, treatment plant managers and operators, laboratory technicians, students, professors, lawyers, environmental scientists, safety and maintenance professionals and equipment manufacturers and distributors.

## Our vision

To provide a Water Environment Federation (WEF) organization (Illinois, Minnesota, Wisconsin) offering multiple opportunities for the exchange of water quality knowledge and experiences among its members and the public and to foster a greater awareness of water quality achievements and challenges.

## Join now

**CSWEA** offers membership in Central States and the Water Environment Federation, (WEF), and this membership category offers the best value for professionals with the State, Regional, National and worldwide connections of both a local WEF Member Association (CSWEA) and the preeminent organization of water professionals, worldwide, WEF. Several membership categories are available and described within the membership application.

**CSWEA** also offers an associate level membership, which provides membership in CSWEA only for those who may just be interested in CSWEA membership. While we strongly suggest membership in both CSWEA and WEF, we understand that for some, membership in CSWEA only makes the most sense. [CS](#)



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# CSWEA Associate Membership Application 2008

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* Business Address * Home Address Street or PO Box			
City	State	Zip	Country
Home Phone Number	Business Phone Number		FAX Number
E-mail Address			

## Employment Information

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

## Associate Membership in Central States Water Environment Association

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

## Payment Information

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# SANITAIRE

## Total Process Treatment Solutions

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



- **Fine Bubble Aeration Equipment**

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

- **Sequencing Batch Reactors (SBRs)**

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



- **MIZAIR® Oxidation Ditch**

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

- **DrumFilters**

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



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Sanitaire



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