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The Clarifier is the publication of the Wisconsin Wastewater Operators’ Association and is intended to inform and educate the membership on issues related to the treatment and control of wastewater. The Clarifier is produced five (5) times each year: February, April, June, September, and December. All members are encouraged to contribute to the mission of the Clarifier.

The Wisconsin Wastewater Operators’ Association is a non-profit organization dedicated to educating, informing, and advancing the wastewater profession. WWOA has approximately 2,000 members divided throughout six regions: Southeast, Southern, Lake Michigan, North Central, Northwest, and West Central.
President’s Message for April 2011: Be Prepared

The main topic of discussion these days is the Governor’s Budget Repair Bill and how it’s going to effect all of us. Along with this is what may happen to implementation of the phosphorus rule, the thermal rule, and the sanitary sewer overflow rule. The Governor’s position will definitely slow up the process. One thing is certain, that change is eminent and out of our control.

As I am writing this message, it is early March and snowing. The temperatures are becoming milder and like most operators I have concern regarding a quick melt and high flows to the plant. We certainly can’t do much about the weather but we can be ready and prepared with lift stations and pumps maintained and available as necessary. My son Chris, a Boy Scout, would say “be prepared.”

On February 16th our Technical Program Committee met in Tomah, Wisconsin to review 61 papers submitted and chose the best of the best for our conference in October. Thirty five papers were selected and a great program was developed. Much credit needs to be given to Wade Peterson, this years Vice President and Technical Program Committee Chair, along with all the committee members.

On February 24th the Government Affairs Seminar took place in Middleton, Wisconsin. I wasn’t able to attend this year, but I understand the program was very impressive as usual. Thanks to WWOA Directors Kevin Freber and Dale Doerr, who serve on the Government Affairs committee.

During February I had the chance to attend the scheduled southern and Lake Michigan region meetings. The Regional Officers did an outstanding job with the agendas for both meetings Excellent training at a very reasonable cost to our members. Thank you!

February 24th and 25th, the WWOA exhibited at the Annual Wisconsin Guidance Councilor Conference in Stevens Point. WWOA Director Lyle Lutz and myself represented the WWOA and promoted careers in wastewater treatment. With many of us retiring in the next several years there is concern in having enough trained professionals to fill the openings.

Up and coming is the 29th Annual Spring Biosolids Symposium on March 22nd. Another great agenda is planned. Thanks to WWOA Director Dennis Egge for serving on the program committee.

Remember to go to the WWOA website for the latest on all the scheduled training events. The website address is www.wwoa.org. WWOA Director Kelly Zimmer is the Regional Coordinator this year and is planning on attending many of your Regional Meetings throughout the state. Please feel free to contact Kelly or myself as questions develop.

I hope everyone had a happy Easter!

Until next time, all the best to you,

Dave Carlson
WWOA President

2011 Clarifier Due Dates

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Updated Facilities Provide Reliable Wastewater Treatment for the Village of Port Edwards

By: Dan Greve, P.E., MSA Professional Services, Inc. and Joe Terry, P.E., Engineer/Administrator, Village of Port Edwards

The Village of Port Edwards is located along the Wisconsin River in Wood County, between the cities of Wisconsin Rapids and Nekoosa. Originally known as “Frenchtown”, the Village of Port Edwards was incorporated in 1902 but traces its history back to 1840 when a sawmill was constructed by the John Edwards family. The sawmill eventually evolved into a paper making operation, which grew to become the Nekoosa-Edwards Paper Mill Company, later owned by Georgia-Pacific, and then Domtar. The paper mill in Port Edwards ceased operations in 2008, however many Village residents continue to work in the nearby mills and other paper-related industries. ERCO, a large manufacturer of potassium hydroxide, chlorine, caustic soda and other chemicals, is located in Port Edwards.

The Village owns and operates a wastewater treatment facility which is located on the shore of the Wisconsin River near the south edge of the Village. The wastewater treatment facility was upgraded in 2006 and replaced a 30 year old trickling filter plant that was nearing the end of its useful life due to the age, condition and capacity of much of the equipment and structures.

The treatment facility is located on a very small site along the north bank of the Wisconsin River, and is between wetlands to the east and west. Expansion to the north was not possible due to the presence of the paper mill wood yard. Construction of a new treatment plant at a different site would have been prohibitively expensive. The situation was made more complex when it was discovered during facilities planning that the site had mistakenly been designated to be within the Wisconsin River floodway on the FEMA flood hazard map.

The Village and their engineering consultant MSA Professional Services, Inc. worked with the Wisconsin Department of Natural Resources and FEMA to get a letter of map revision approved, which removed the treatment facility from the floodway.
plant site from floodway designation on the flood hazard map. Floodplain and wetlands issues, however, still had to be addressed during design of the new treatment facilities.

The old wastewater treatment plant was kept in operation while the new facilities were constructed immediately adjacent, including construction within the area of the old excess flow equalization basin.

The wastewater treatment facility is designed for an average flow of 0.538 mgd and an average BOD load of 616 pounds per day. The facilities include:
- Mechanically-cleaned fine screening
- Influent pumping
- Vortex-type grit removal and grit dewatering
- Oxidation ditch biological treatment
- Alum addition for chemical phosphorus removal
- Final clarification
- Ultraviolet light disinfection
- Emergency power generation equipment
- PLC-based supervisory control and data acquisition (SCADA) system, which also incorporates the various Village water system facilities.

Biosolids produced in the wastewater treatment process undergo aerobic digestion and are land applied on agricultural fields. After the new wastewater treatment facilities were placed into operation, the old anaerobic digester structure was converted to an aerobic digestion tank, and one of the two old trickling filter structures was rehabilitated into a sludge storage tank by constructing a new cast-in-place concrete floor and wall within the existing structure. Reuse of the existing structures was economical and conserved space for future expansion on a very limited site.

There has been significant seasonal variation in wastewater flows at Port Edwards, due in part to prevalence of foundation drains at older homes and businesses. Two separate oxidation ditch basins were constructed, along with two final clarifiers, to allow for operational flexibility.

Because of the local paper mill closure and the recent economic downturn, the wastewater flows remain significantly below the 20-year design capacity of the treatment facility. The plant is typically operated with only one oxidation ditch unit and one final clarifier in service.
The upgraded wastewater treatment facility greatly improved the effectiveness and reliability of treatment and the ease of operation. The treatment performance of the Port Edwards wastewater facility has been excellent, as demonstrated by the 2010 effluent quality data shown in Table 1. The facilities are expected to provide for the wastewater treatment needs of the residents and businesses in the Village of Port Edwards for many years to come.
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Clarifier announces new additions to staff

Kay Curtin has joined the Clarifier and will be responsible for selecting and organizing each feature wastewater treatment plant article for each month.

Kay has long been a member of WWOA serving on the board for many years. In addition, Kay plans to continue to provide “Brian Teasers” for each issue as well. Kay also will provide editorial support if and when it is needed.

Doralee Piering has joined the Clarifier and will be responsible for typesetting and issue production for each issue. Since 2003 Doralee has worked at Energenecs in Cedarburg.

Please extend thank yous to these volunteers that make your publication what it is.
Attention All Golfers
“Operators Golf Outing”
Refreshments – Food – Prizes
Monday, June 27th 2011
Tee-Off: 10:00am Shotgun Start

Old Hickory Gold Club, W7596 Hwy 33 East,
Beaver Dam, WI 53916

Cost: $60.00 per person includes:
Lunch (Burgers, or Hot dog and chips)
Dinner (Stuffed pork loin with salad, vegetables, potatoes)
18 holes of golf with cart.

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Donated prizes encouraged as well.
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When microorganisms are healthy and active, and enjoying life in your treatment plant, they consume oxygen, especially in the presence of food. When microbe life isn’t so good, they don’t.

Besides looking under the microscope to see how your bugs are doing, the Oxygen Uptake Rate (OUR) test and Respiration Rate (RR) tests are great tests to determine how your bugs are “breathing.” Simply, if your bugs in the presence of food (BOD), are “breathing”, they will be consuming oxygen. At the head end of the aeration basin, where food is plentiful, the Oxygen Uptake Rate (OUR) will be high. If your bugs have been affected by anything, such as a toxic load or low/high pH, it could affect their breathing, and oxygen consumption is low or maybe not even occurring.

The Oxygen Uptake Rate (OUR) and Respiration Rate (RR) tests measure the health and activity of the microorganisms through the amount of oxygen they consume. The Oxygen Uptake Rate test is a measure of the oxygen consumed in a sample of activated sludge and is expressed as mg/L of oxygen per hour.

The Respiration Rate relates the OUR test results to the concentration of organisms in the activated sludge sample. OUR results are used to calculate the RR. OUR results are usually graphed and the linear part of the graph used for determining the oxygen consumption in that time interval.

continued on page 11

IN CONTROL

Breathe In...Breathe Out

April 2011

Successful Operations through Process Control

By Jack Saltes, Wastewater Operations Engineer, Department of Natural Resources

Keeping Your Facility Flowing

That’s the Ahern Advantage.

Now Offering Motor & Pump Repair
continued from page 11

\[ \text{OUR (O}_2 \text{mg/L}*\text{hr}) = \left(\text{D.O. concentration at 0 minutes (mg/L)} - \text{D.O. concentration at x minutes (mg/L)}\right) / x \text{ minutes} \times 60 \text{ min/hr} \]
\[ x \text{ is usually ten minutes} \]

\[ \text{RR (O}_2 \text{mg/gram}*\text{hr VSS}) = \text{OUR (O}_2 \text{mg/L/hr}) / \text{MLVSS (grams)} \]

The OUR can be affected by the microorganism population and viability, temperature, alkalinity/pH, BOD loading and toxicity. OUR results are often shown on a line graph, showing higher results (steep slope) at the head of aeration basin and lower results (less steep slope) at the end of the aeration basin. If a toxic load has hit your plant, and impacted most of your bugs, there would be little to no oxygen uptake and the line in the example on page 11 would be almost flat.

The operator is referred to the Basic Activated Sludge Process Control Manual (WEF 1994) or contact me at jack.saltes@wisconsin.gov for more detailed information and procedures for these tests.

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WHEN: Thursday June 9, 2011
WHERE: Turner Hall, Watertown, WI

MORNING SESSION:
Speakers on Collection System Issues

AFTERNOON SESSION:
Vendor and Equipment Displays,
Door Prizes, Product Demonstrations

TENTATIVE TOPICS:
Storm Sewer Dye Flooding Case Study
Private Property: Foundation Drains, Sump Pumps, etc
Safety: Arc Flash Safety and PPE
Construction Site Sediment and Erosion Control
Septic Hauling and its Effect on the Collection System
Collection System Rehabilitation Case Study
Quick Hits: Control Panel Technology
Sewer Jet Nozzle Technology

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Andrew Craven, 608-251-4843

Vendor Information:
Bob Lecey, 262-377-6360

Brain Teaser
April 2011
Subject: Tertiary Treatments

Introductory:
What is a common problem of filtering wastewater effluent that is low in temperature?

a. Reduction of head loss through the filter media
b. Increased formation of mudballs
c. There is increased air binding of the filters
d. The media does not regrade properly
answer on page 28

Wastewater Treatment Plants, Advanced Waste Treatment Advanced:
In the ammonia stripping process, ammonia nitrogen is converted to dissolved ammonia gas, then is liberated from the solution by passing the wastewater over a stripping tower. For optimum ammonia gas removal, the pH of the wastewater must be in what range:

a. 5.5-5.8  b. 6.8-9.0  c. 9.2-10.1  d. 10.8-11.5
answer on page 28

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Nominated a deserving person for a WWOA award

Do you know someone who is the epitome of a dedicated plant operator? One who runs his plant to peak performance? I bet you do!

How about someone who provides technical support to the operators of Wisconsin, by his or her efforts benefitting the waters and people of the state? Or a person who has gone the extra mile for our great organization – who by their service has benefited all of us in the WWOA?

The WWOA is soliciting nominations for the several annual awards that are presented at the Annual Conference. The selected individuals will be honored at the Awards banquet.

The awards are as follows:

**George F Bernauer Award** The criteria includes successful plant performance, and/or successful solution of important or complicated operational problems, and/or outstanding contributions in the field of wastewater technology in the State of Wisconsin. The nominee may be a municipal, industrial, or institutional operator, administrator, or educator in Wisconsin. It is not limited to WWOA members.

**Koby Crabtree Award** is awarded to a WWOA member for excellence in technical support provided to others in the field of wastewater treatment. The individual should be a recognized authority in wastewater, share knowledge through presentation, contribute to problem solving, and provide service regardless of compensation.

**Service Award** is presented to a person who has made an outstanding contribution to the WWOA in the areas of promotion, operation, management, program participation, or education. The nominee should be an active member of WWOA for a period of ten years.

**Newcomer of the Year Award** recognizes an operator, support staffer, or environmental technician with less than three years of experience as of August 1, 2011. The nominee should demonstrate higher than average growth in their place of employment, a willingness to learn, innovation on the job, and exceptional enthusiasm for their profession.

The nominator should be a supervisor, manager, peer, co-worker, or DNR personnel familiar with the day-to-day efforts of the nominee. WWOA membership is not required, and a two year membership or renewal is included in the award.

**Regional Operator of the Year Award** is given out to someone who has demonstrated excellent plant performance, and/or successful solution to a problem, and/or contributions to the wastewater field. It is limited to operators of municipal, industrial, or institutional wastewater treatment facilities. The nominee should be a five year member of WWOA.

An award nomination form is on the next page of this issue of the Clarifier. All of the award nominations, except the Operator of the Year, need to be received by August 1 and should be sent to Randy Thater. The Operator of the Year deadline is July 1 and the nomination form should be submitted to each individual region. Contact information is on the nomination form.

For the full awards criteria and a list of past honorees, please go to the WWOA website, wwoa.org, and select Our Organization/Annual Awards.

There are plenty of people who fit the criteria for the above awards in the wastewater field. It is the membership that knows best who these people are.

Please take the time to submit the name of a deserving individual.
WWOA Award Nomination Form
Deadline: August 1, 2011, except Regional Operator July 1, 2011

Check Award Nomination: Bernauer ____ Crabtree ____ Newcomer of the Year ____ Service ____

Regional Operator _____ Regional affiliation) ________

Nominee’s Name __________________________ Address: ____________________________________________________

City: _______________________________ State:_______ Zip: ___________________

Home Phone: _________________________ Work Phone: ______________________________________________________

Employer: ___________________________ Occupation/Job Title: ________________________________________________

Date Joined WWOA: ____________ WWOA Membership Number: ____________

Regional Affiliation: _______________ Regional Officer Positions ? ______________

Brief Description of Nominee Activities and Achievements: (attach sheets if needed)
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

Why Do You Feel Nominee is Deserving of Award Being Nominated For?
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________
__________________________________________________________________________________________________

Submitter Name: ___________________________________________________________________________________
Address:  _________________________________________________________________________________________
City: _____________________________________________________________________________________________
State:  ________Zip:____________________

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continued from page 16

Please mail or email nomination forms for Bernauer, Service, Crabtree, and Newcomer of the Year to:

Randy Thater – President Elect Waukesha WWTP
600 Sentry Dr., Waukesha WI 53186
Work 262-524-3631, Fax 262-524-3632
rthater@ci.waukesha.wi.us

Please mail or email nomination forms for Regional Operator to the appropriate regional committee members. Regional Operator awards contacts are the regional chairs unless otherwise noted:

Lake Michigan Vice-Chair,
Jeff Smudde, Vice Chairperson
Green Bay Met SD
2231 N. Quincy St., Green Bay, WI 54302
920-438-1003  jsmudde@gbmsd.org

North Central Chair, Terry Vanden Heuvel, Chairperson
Merrill WWTP
1004 E. 1st St., Merrill, WI 54452
715-536-5263  Terry.vandenheuvel@ci.merrill.wi.us

Northwest Chair, Sari Marks, Chairperson
Hayward WWTP,
10627 N Roynona Road, Hayward, WI 54843
715-634-4612  Pw1@centurytel.net

Southern Chair, Bernie Robertson, Chairperson
WDNR – South Central Region
3911 Fish Hatchery Road, Fitchburg, WI 53711
608-273-6312  Bernie.robertson@wisconsin.gov

Southeast Chair, David Bogie, Chairperson
Envirotech Equipment Co.
923 Sanctuary Court, Pewaukee, WI 53072
262-264-0231  dave.bogie@envirotechequipment.net

West Central Chair, Tom Grunewald, Chairperson
PO Box 8, Boyd, WI 54726
715-667-3282  village023@centurytel.net

The regional awards committees are to forward the selected nominee to Randy Thater by August 1, 2011 for approval by the board.
Southern Region Meets at Midwest Water Industry Expo

There were 45 people in attendance at the meeting. We were greeted by Bernie Robertson – Southern Region Chairperson who introduced Tom Mulcahy (Mulcahy/Shaw Water, Inc.), who gave an overview of the Midwest Water Industry Expo. In addition to the multitude of exhibits, 3 Classroom Sessions are being held every hour throughout the day in the Aloeswood, Marula & Aralia Rooms. As an added “incentive” to attend the sessions, a free raffle ticket is provided to each attendee of each session. Tom was very appreciative that WWOA was attending the Expo.

The morning agenda allowed the members to attend the classroom sessions and visit the exhibitors at the Expo.

After lunch, Bernie Robertson conducted the business meeting for the Southern Region. After approval of the agenda, minutes and the Treasurers Report, Bernie introduced Dave Carlson – WWOA President, who acknowledged the attendance of Kelly Zimmer, Dennis Egge & Kevin Freber.

continued on page 20
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Dave informed the group that the Technical Committee is convening in Tomah next Tuesday (February 15th) to select topics/speakers for the Statewide WWOA Conference. Dave also mentioned the scholarships available to children of members.

Kelly Zimmer – Southern Region WWOA Coordinator reminded the group about various upcoming events of interest. Government Affairs will be held February 24th at Middleton (Marriot West); CSWEA Leadership Academy at Monona Terrace (Madison) on April 4th; the 16th Annual Education Seminar in Madison on April 5th; the 84th CSWEA Annual Meeting in Brooklyn Park, MN on May 15-19; WI Section Collection System Seminar “Classic” in Watertown on June 9th; CSWEA-CSX 2011 will be held at the Kalahari Resort on July 21-22; the WI Section Collection System Seminar “Northwoods” in Marshfield on July 28th; the WWOA Annual Conference will be held in La Crosse from October 4th to October 7th (pre-conference workshop will be 2 consecutive sessions); WEFTEC 2011 will be held in Los Angeles, CA on October 15-19.

Bernie also reminded the group about nominations for this years Southern Region WWTP Operator of the Year Award (every year we struggle with nominations).

WWOA is again seeking teams to participate in the Annual Operators Competition.

DNR Update: Doris Thiele, Basin Engineer for the Wisconsin DNR. The WPDES permit backlog is growing with 66 permits expired by June 30, 2011. There are 152 permits in the Southern Region, which equates to a 43% backlog. Last year, 18 permits were reissued. Complexities which are contributing to the backlog include: mercury & chlorides (which require an EPA variance), the Thermal Rule (Oct 2010), Phosphorus Rule (Dec 2010) and the Rock river TMDL.

Doris covers the eastern half of the region (Columbia, Dane, Dodge, Jefferson & Rock Counties). Dave Carper covers the western half of the region (Grant, Green, Iowa, Lafayette, Richland & Sauk Counties). Wastewater Specialists are Rich Edwards & Bob Liska. They cover industrial facilities, pretreatment & septage.

continued on page 22
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“Borrowed” staff (from other regions of the state) were assisting the southern region with permits. Recent statewide retirements have caused further backlogs. Recent SCR retirements include Ken Denow & Alice Miramontes. New hires include Steve Warner, Amy Martin and Phil Sprangler (the new municipal permit drafter).

Doris emphasized the need to contact the department in writing when permit exceedances occur (as written in the general conditions of all WPDES permits). Also mentioned were: missing samples, missing DMRs, incomplete and late applications.

Continue to follow the current permit if yours expires.

Also discussed were landspreading sites and that the backlog grows in the spring (apply early). Duplicate approvals can be problematic. Management Plans are missing soil samples (every 4 year requirement), other violations and lagoon desludging.

Amanda Boyce, Water Quality Standards Section of the DNR gave an update on the new Thermal Regulations.

Basics of NR 102 and NR 106: Public Health & welfare 120 degrees; Fish and aquatic life acute (lethality) and sub-lethal (spawning, juvenile growth & gametogenesis).

Ambient Temperature: specific large rivers; Northern and southern inland lakes; Great Lakes waters; Non-specific waters (default).

Who needs to be evaluated? Does the point source have a WPDES permit? Does the point source discharge heat or is there a heat gradient? Does the point source discharge to a surface water to the state? If the answer to these 3 questions is yes, the permit must be evaluated for a thermal limit. Point source discharge from Stormwater is exempt.

Rule Flexibility: NR 102 includes site-specific ambient temperature values.


Intro to Limit Calculations: Use Qs:Qe ratio for preliminary evaluation. Qs from USGS Qs = ¼ of the 7Q10. Qe = annual design flow (or seasonal design flow). Also needed is effluent temperature data. Equations found in NR 106.

Special cases: LAL Limit = 86 degrees daily maximum Effluent channel = 120 degrees daily maximum Wetland – case by case with 120 degree cap

Monitoring Requirements
- Only monitor when you are actively discharging during a 24-hour period
- Continuous method
  - Record data every 15 minutes or less
- Multiple grab sample method
  - Record data at 6 evenly spaced time intervals
  - Sampling interval can be modified via supporting data
- Collect data at discharge point or closest point to it within a facility

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What to record
• Effluent temperature
  • Daily maximum
  • Highest record value during a 24-hour period

Minimum effluent temperature requirements
• Low variability
  • At least 1 operating day per week for 1 year
• Highly variable discharges
  • At least 1 operating day per week for 2 years
• If insufficient data present, limits subject to drop will be included in permit

Temperature Logger System
• Set-up
• Deploy
• Re-bar and zip ties??
• Download/Re-deploy

Data Logger Options
Hobo ($59 each)
Water Temp Pro V2
TidbiT V2

Waterproof Shuttle
• Communicate between pc and temp. logger via USB
• Download and reset logger in the field
• Can be used with multiple tidbits
• AA batteries
• Cost: $230 each

HOBOware Pro Software
• Required for temp. logger set-up and download.
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• Easy export to excel.
• Cost: $89

continued from page 22

Amanda Boyce

continued on page 24

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DC (Dissipative Cooling) Overview
• Cooling effects associated with heat loss to the ambient water, the atmosphere and the surrounding environment (NR 106.59)
  • Dispersion
  • Diffusion
  • Dilution
  • Heat Dissipation

Why request dissipative cooling?
By successfully supporting DC, weekly limits are no longer included in permit

Facts to consider:
• Permittees are responsible to provide the Department with all relevant information
• Data collection may be required
• For POTWs only

Things to look for – Plume Behavior
• Zone(s) of free passage
• Zone does not extend more than 25% of the cross-sectional area or more than 50% of the width of the receiving stream

Things to look for – Rapid Heat Loss
• High exit velocity
• Structures
• Ambient flow conditions
• Loss to atmosphere

Things to look for – Other
• Biota
• Endangered/threatened species absent
• Difference in biotic communities in and outside of discharge
• No impediment of migration

• Multiple discharges present
• Others?

No data available
• Some facilities may not have data available
• Recommendations
• Perform temperature profile study
• If needed, perform dye study
• Provide visual evidence

Thermal profile
• Goal:
  • Represent vertical and horizontal distribution of mixing zone
  • Represent significant morphological changes
    • Depth
    • Stream flow/direction
    • Substrate
    • Emergent features
    • Others
• Needed Elements:
  • Ambient temperature reading upstream
  • Surface temperature readings and readings with depth
  • Depth at each sampling
  • Distance between sample and discharge source
  • Conductivity measurements

• Conclusion
• Municipalities may be subject to thermal limits, particularly daily maximum and weekly limits
• Effluent temperature monitoring will likely be required
  • If unspecified, can use continuous or multiple grab methods
• Dissipative cooling can provide relief from weekly limits
  • Marginal amounts of data collection will likely be required

See the WWOA website for complete Powerpoint Presentation.
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Melrose Hosts West Central District Meeting at River View Inn in North Bend

The meeting was opened by Chair Tom Grunewald and it was brought to the attention of those attending that the WWOA golf outing will be held at Old Hickory in Beaver Dam on June 27, 2011. The Northwoods Collection Seminar will be held on July 28, 2011 in Marshfield. On July 27, 2011 there will be sporting clays in the morning and a golf outing in the afternoon. Afterwards a steak fry will be held.

In between speakers, Kelly Zimmer, from the WWOA Board, talked about the need for participants in the operators’ competition at the WWOA conference. The second speaker was Chris Groh from WRWA. He discussed topics related to wastewater plants. The main discussion was on electronic filing of new permits. He used the internet to show attendees how to locate the permit, the different sections, and how to fill them out.

The first speaker of the morning was Bob Doll from Flygt Pump. He discussed the different ways to design a lift station. He discussed the differences from wet pit vs. dry pit, life cycle costs, different controls, duty point=design point=operating point, and the different problems that occur with the pumps.

The next speaker was Jim Miller from Foth who talked about Asset Management. He discussed taking inventory of everything you have, including personnel. Going through all equipment, mains, sewers, hydrants, and streets while writing down how old they are and when they should be replaced. He stated that the definition of Asset Management keeps the cost of utilizing your system in a manner that avoids breakdowns and maintains a service level in line with what the user requires.

After a great dinner, Clint Soule spoke about mixers in lift stations. He showed some slides depicting different lift stations at some wastewater plant. They showed how they looked before a mixer was added, and what it looked like after the addition. He stated that the mixer works great if you have a lot of grease entering your lift station. He showed different ways to put the mixer in on rails that are

continued on page 27
already in a lift station and how to add rails specifically for a mixer. Clint stated that the mixer helps eliminate odor, reduce grease build-up, and break up the crust blanket.

The last speaker of the day was Shawn Welte of Davy Engineering. He discussed thermal water quality standards, which is the result of an EPA guidance. The purpose of it is to determine the affect of water temperature on fish and other aquatic life. This went into effect in October of 2010.

The revisions are to Codes NR 102 and NR 106 and affects all WWTP dischargers. It goes into effect the next time the WWTP has to write a permit. You will have to monitor a minimum of 1 year, likely 2 years. For a continuous sampling you will record temperature at intervals of 15 minutes or less during active discharge in any 24-hour period. This requires a data logger and is the most practical method. Shawn then showed different types of data loggers.

Respectfully submitted,
Tom Grunewald - WCWWOA Chair

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**Symbiont adds Pavel Hajda**

Symbiont, (Science, Engineering and Construction) is pleased to announce the addition of Pavel Hajda, Ph.D., P.E. to its Municipal Group. Pavel has more than twenty years of experience in the fields of water/wastewater treatment, most recently as a Senior Process Engineer with an Illinois consulting engineering firm.

Pavel’s recent focus areas include planning and design of municipal wastewater treatment plant retrofits and draft permit reviews and other advocacy for NPDES permittees. He has been actively participating in the Illinois Nutrient Standards Workgroup and on the Illinois Association of Wastewater Agency’s Nutrients/TMDLs Subcommittee. Pavel has also been a member of the technical committee for Central States. Pavel has a bachelor’s degree in Chemical Engineering from the Institute of Chemical Technology, Prague, Czech Republic, and M.S. and Ph.D., in Civil/Environmental Engineering from Marquette University, Milwaukee, Wisconsin.

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Clint Soule talks about mixers in lift stations.

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Brain Teaser Answers

Subject: Tertiary Treatments

Question 1: What is a common problem of filtering wastewater effluent that is low in temperature?
Answer Question 1: c. There is increased air binding of the filters
Reference: Sacramento College Operation of

Question 2: In the ammonia stripping process, ammonia nitrogen is converted to dissolved ammonia gas, then is liberated from the solution by passing the wastewater over a stripping tower. For optimum ammonia gas removal, the pH of the wastewater must be in what range:
Answer Question 2: d. 10.8-11.5
Reference: MOP 11 Volume 2, Sixth Edition
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Wisconsin Thermal Standards: Potential Changes to My Plant
By: Amanda Boyce

Introduction to Thermal Standards in Wisconsin
Wisconsin has a long history of protecting our water resources and working with municipal wastewater treatment operations for the betterment of the general public. For the past 16 years, the Wisconsin Department of Natural Resources (WDNR) has worked with municipalities, environmental advocacy groups, the United States Environmental Protection Agency (EPA), and other point sources to develop thermal water quality standards. These standards, when used to regulate discharges with elevated temperatures, are designed to protect people from scalding if they were to swim, water ski, kayak, or jet ski near a discharge pipe and to prevent fish and other aquatic organisms from being harmed or killed.

When revisions to the thermal standards began in 1994, there was a specific exemption for municipal POTW discharges. For that reason, effluent limits to meet thermal standards were not included in POTW permits. The exemption was based on the fact that most municipal plants were not purposely adding heat to the waste stream and therefore should not be required to remove incidental heat. However, attorneys for both the DNR and U.S. EPA noted that it was not legal to categorically exempt any type of point source and determined that municipal POTWs would have to show compliance with any revised thermal water quality standards and may be subject to effluent limits.

Who Gets Thermal Limits?
While it still holds true that most POTWs that treat domestic waste do not add heat to the waste stream, there are times of the year when effluent temperatures may be substantially higher than the background temperature of the receiving water and may result in impacts to the local fish and aquatic life community. The most definitive way to assess the risk for this is to collect effluent data to document normal effluent temperatures and to evaluate any available fish and aquatic life community data to determine if there may be existing impacts. Section NR 106.59 (Wis. Adm. Code) identifies the information needs

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and the general process by which the Department will use information to determine which POTWs need effluent limits in their permits to manage effluent temperature. This process is also summarized below:

**Step 1:** DNR completes a preliminary analysis. The DNR performs a preliminary analysis that compares available dilution (Qd) to effluent flow (Qe). This Qd:Qe ratio is used in conjunction with Table 1 in s. NR 106.55 to forecast what type of effluent limitations may be necessary to protect the receiving water. This approach uses three tiers of flow ratios that will result in limits to protect human health limit (120°F), the more stringent of human health or sub-lethal limits designed to protect fish, or both sub-lethal and acute limits to protect fish.

The DNR has calculated “assumed” Qd:Qe ratios using available stream and effluent flow data (See Appendix D of the Thermal Guidance document). Permittees wishing to propose an alternative Qd:Qe ratio may do so by using representative effluent flow and stream flow data. A permittee proposing an alternate stream flow (Qs) must provide DNR with a letter from the U.S. Geological Survey that clearly indicates their concurrence with the alternate value.

**Step 2:** DNR determines the ambient temperature of the receiving water. Assumed background temperature values are specified in NR 102 based on waterbody type. These values were derived from long-term continuous monitoring stations operated by the U.S. Geological Service. The DNR will use these assumed values to calculate limits. If desired, a permittee may collect site-specific ambient temperatures for the purpose of calculating limits. Any permittee choosing to do so should review the requirements in the Thermal Guidance document.

**Step 3:** Permittee gathers sufficient effluent temperature data. In order to determine if effluent limits are necessary in a permit, the DNR will perform a “reasonable potential analysis.” By comparing effluent temperature data to calculated limits, it is possible to determine if there is “reasonable potential” to exceed water quality standards. Without sufficient effluent data to make a complete reasonable potential decision, the thermal rules require DNR to assume that effluent limits are necessary and to include those limits in a WPDES permit. Once sufficient data has been collected, the Department may, at the request of the permittee, re-evaluate the limits to determine if they are necessary.

If the Department finds that the limits are no longer necessary they will be dropped from the permit. Conversely, if a permittee provides enough data with the application to make a complete reasonable potential decision and it is concluded that limits are not needed, the permit will be issued without thermal limits. For this reason, it is advisable for all permittees to collect effluent temperature data as soon as possible in order to have sufficient data for the permit application. Chapter 2 of the Thermal Guidance provides additional information on temperature monitoring methods with suggestions on sample frequency.

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Step 4: DNR calculates limits. Using the information in steps 1-3, the DNR will calculate the permit-specific effluent limitations for each month of the year using the equations specified in s. NR 106.55. As noted in step 3, those limits will be included in WPDES permits when reasonable potential exists for the effluent temperature to exceed them. The inclusion of limits for individual months will help account for natural climatic variability in ambient temperatures.

Alternatives to Limits
There are several alternatives available for municipalities seeking relief from thermal limits. Some of those alternatives allow the variables used to calculate effluent limits to be modified (i.e., site-specific ambient temperatures, alternative dilution values (Qs), etc.). Other alternatives include seeking water quality variances or the performance of water quality modeling.

One alternative that is only available to municipal POTWs is to request consideration of dissipative cooling - a phenomenon associated with rapid heat loss from a discharge to the surrounding environment resulting in a negligible or non-existent adverse impact on the aquatic community.

These provisions are outlined in s. NR 106.59 and apply only to limits designed to prevent sub-lethal impacts to receiving water organisms. Dissipative cooling evaluations may require modest amounts of data collection on the part of the permittee. In making a decision on whether or not to request a dissipative cooling assessment, a permittee should consider the following questions:

1. Is your facility a municipal POTW and are you subject to weekly limits?
2. Is there a zone of free passage where fish and other biota can migrate without being impacted by a thermal plume?
3. Does the mixing of the effluent and the receiving water create turbulent conditions that result in rapid mixing near the discharge point?
4. Are there unique characteristics about the receiving stream or effluent discharge configuration that support rapid heat loss?

More information about dissipative cooling, performing a dissipative cooling evaluation, and the dissipative cooling application process can be found in Chapter 8 of the Thermal Guidance document.
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