CENTRAL STATES WATER

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

96th ANNUAL MEETING

May 22-24, 2023 | Saint Paul, MN

PLANT PROFILE:

Western Lake Superior Sanitary District

PLUS:

- 2023 Officer Nominations
- 28th Annual Education Seminar Preview
- MSDC 2022 Student Design Winner: Instituto Tecnologico de Costa Rica

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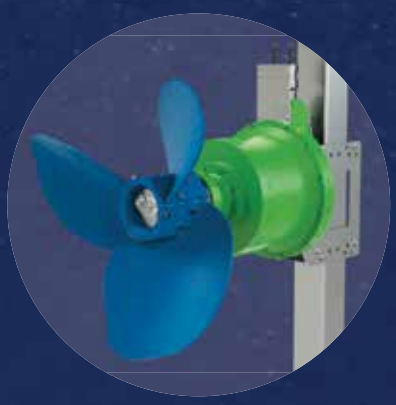

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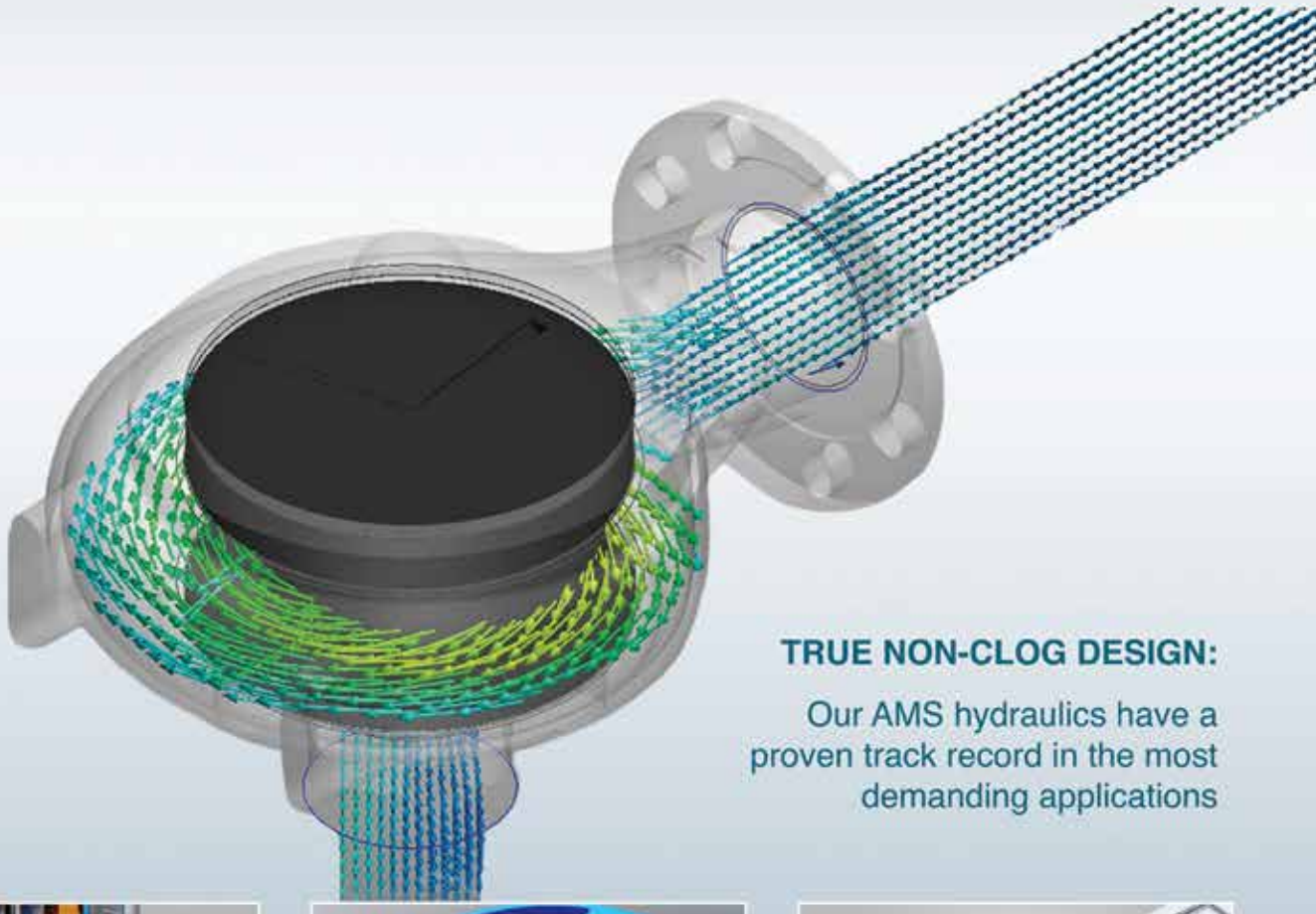

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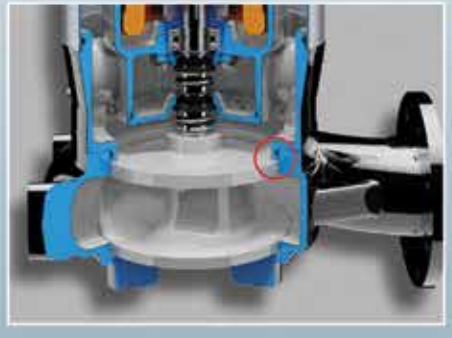

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Don't Underestimate Small Actions

By Tracy Hodel

My last message. Wow, time sure flies. As I am writing this, it is 18 degrees below zero outside (not including windchill) and we are experiencing a record-breaking year in snowfall totals. By the time you are reading this, it will be springtime. I cannot wait. I look forward to when my irises and tulips start popping up and brilliant bright green leaves start to materialize on the branches of trees. My kids call me the crazy plant lady. I do admit, I am obsessed with plants and flowers. When I walk in the door after visiting a greenhouse or Home Depot, I'm always carrying something new to plant. My husband doesn't even say anything anymore – he just rolls his eyes. There is just something about springtime. Like the start of a new year, it's a great time to readjust and refocus on things that matter.

A special thank you to the Executive Committee. We held our Annual Winter Meeting in January. Many traveled far to attend and address open association items. Thank you to Jane Carlson and Joan Hawley for their work on updating our governance documents. This took a tremendous amount of effort and it is appreciated.

The Local Arrangements Committee and Technical Program Committee have been hard at work preparing and finalizing all the details related to our 96th CSWEA Annual Meeting that will be held at the RiverCentre in Saint Paul, MN on May 22 to May 24, 2023. Our conference theme is *Inspiring Action*.

You will have many opportunities to take action and inspire action throughout this year's Annual Meeting.

> "One conversation can spark an idea that could have incredible impacts."

These opportunities include participating in a service project, learning what others are doing to inspire action within your organization, getting to know our emerging leaders better, hearing about a new process or product, being a mentor, asking for a mentor, or donating to the silent auction while supporting a program with an important mission: clean water for all. There are endless opportunities throughout the three-day event for action. The ultimate opportunity is networking. One conversation can spark an idea that could have incredible impacts.

A special thank you to Liz Kramer, our Local Arrangements Committee Chair. It is unbelievable how much time and effort she has spent leading the planning efforts. On top of that, she is the Co-chair for Minnesota's Section Innovative Conference that was held in February.

The LAC has developed an incredible program. Monday will include many fun activities to choose from such as Top Golf (all skill levels welcome), an exciting Stormwater Tour, the Metro Wastewater Facility Tour in Saint Paul, and a tour meet-up where attendees can network and play some trivia. The Meet & Greet/Social will be held at the RiverCentre's outdoor pavilion. Come say hi to old friends, meet new colleagues, and play a game or two of bags.

We are excited to share that Chief Matthew Love will be our keynote speaker. He is a nationally renowned speaker, and he will focus his message on "Inspiring Action," our conference theme. In this high energy keynote presentation, Chief Love applies traditional leadership principles with a fresh perspective to equip and inspire teams in creating a motivational environment. Chief Love provides examples through story and illustration, enabling the leader to channel passion and take action, which promotes team dynamics and the achievement of big goals.

Inspiring action is a key component of all our current focus areas for our association. It's about mentoring and engaging our emerging leaders, thinking big, having bold ideas, and being brave enough to implement them and take action – don't underestimate the impact of small actions.

Tuesday and Wednesday both include exhibitors, exhibitor lunch and reception, technical and poster sessions, ethics speakers, operators track, an awards banquet, and so much more.

I am excited to see everyone at the Annual Meeting. It has truly been an honor to serve as president the past year. I know without a doubt that under Amy Underwood's leadership, our association will continue to provide tremendous services and opportunities to our membership.CS

Water Environment Federation
the water quality people

Pursuing a Life Free of Water Challenges

By WEF Delegates David Arnott, and Rich Hussey

David Arnott

Rich Hussey

As your WEF delegates, we strive to keep you up to date and provide resources and connection to WEF. Our main objective is to be the conduit of information between CSWEA and WEF. Delegates also advise the WEF Board of Trustees. Our update provides a recap and highlights of recent WEF events.

WEF BUSINESS MEETING AND HOUSE OF DELEGATES MEETING DECEMBER 8, 2022

The meeting agenda and brief notes from the meeting were as follows:

- WEF will be actively approaching inclusivity at meetings with a Diversity, Equity, and Inclusion (DEI) spotlight, where we will explore a DEI topic or interest for a few minutes before we kick-off at the meeting.
- WEF provided updates on the activities of House of Delegates (HOD) committees, workgroups, and the task force.
- The HOD spoke on Policies and Procedures updates, then voted on and approved the section pertaining to the WEF appointments to the Delegates-At-Large (DAL). In the future, WEF will appoint DALs partially based on DEI. WEF sees change as an opportunity to enhance and promote DEI.
- The Board of Trustees provided updates on the HOD of the Future.
- The Board of Trustees provided updates on the WEF strategic plan.
- WEF received updates from the Committee Leadership Council (CLC). The CLC continues to lead the Member Engagement Transformation Committee (METC) to promote enhanced engagement of members with WEF. The CLC is also launching a new tool to replace WEFCOM, the portal WEF uses to archive information. Stay tuned for more information on this change. The CLC is promoting the idea of using the term "community" instead of "committee." WEF feels the new term is more inclusive.
- WEF launched WEFMAX 2023 season with host promos.
- WEF presented a spotlight on US and International delegates.

WEF'S NEW STRATEGIC PLAN

WEF is setting its sights on new horizons in preparing to lead the journey toward a "Life Free of Water Challenges."

The three main goals of the new WEF strategic plan include:

1. Attract and develop a diverse and passionate water workforce
2. Cultivate a purpose-driven community to sustainably solve water challenges for all
3. Lead the transformation to the Circular Water Economy

As part of WEF's Strategic Plan, they have clarified their values. Below are the values that are the foundation to the plan.

1. Collaboration – working *together* to improve our water environment
2. Customer Service – keeping all stakeholders and customers in mind at all times
3. Bold Leadership – being brave, trying new things, being growth oriented
4. DEI – continue to promote and live by this

WEF is laser-focused on living by the new plan and carrying out the plan in the implementation period of the next three years. The plan provides the "filter" for all WEF activities going forward.

2022/2023 HOD WORKGROUPS

The 2022/2023 HOD Workgroups are set. The new HOD workgroups along questions each workgroup will be focused on are:

1) HOD of the Future
2) Water Advocacy at State/Local Level
3) WEF Strategic Plan Rollout

The HOD of the Future Workgroup

Dave Arnott is on the HOD of the Future workgroup. This workgroup will consider how the HOD needs to change to better serve the changing needs of MAs and remain relevant. This workgroup has had two meetings since WEFTEC.

Highlights from the charter for this workgroup are as follows:

With a roster of approximately 100 delegates from all over the federation, our size, reach, and influence afford us the opportunity to effectively carry out these functions. However, delegate participation is much lower than ideal. While some delegates go above and beyond "the call of duty" serving in meaningful ways on multiple committees and task forces, others do less than is expected while some do close to nothing. In addition, since the Board of Trustees is releasing WEF's new strategic plan, it's important to align both the structure and function of the HOD with the new plan.

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"As WEF delegates, our main objective is to be the conduit of information between CSWEA and WEF."

Subgroup 1 – HOD Structure and Function

- Carefully review WEF's Strategic Plan and determine how best to align the structure and function of the HOD with the new plan.
- Provide recommendations for changes to the HOD structure and function including language for updates to the Policies and Procedures where necessary.

Subgroup 2 – Delegate Participation

- 100% participation from delegates.

Subgroup 3 – Planning for the Future

- What's the vision of the future of WEF and WEF Member Associations? Considering that, what should the HOD look like to be most effective in that envisioned future?
- How can we increase the visibility and communicate the value and importance of the roles of WEF HOD delegates?

The Water Advocacy at State/Local Level Workgroup

Rich Hussey is on the Water Advocacy at State/Local Level workgroup. The Water Advocacy has held two meetings since WEFTEC. The overall summary, initiative, and goals of this workgroup for 2023 are as follows.

Subgroup 1 – State, Local and Provincial Advocacy

- Gather best practices/ guidance for state, local, and provincial government outreach from active MAs.
- Provide guidance on how to leverage federal outreach efforts for state, local, and provincial benefit (and vice versa).
- Determine the top five organizations MAs are collaborating with for state, local, and provincial advocacy.

Subgroup 2 – Federal Advocacy

- Provide input to WEF Government Affairs Committee on enhanced partnerships with other water advocacy organizations that make sense to enhance our advocacy efforts.
- Determine how best to increase the participation of WEF delegates in the annual "Fly-In."
- Provide input to WEF Government Affairs Committee on the effectiveness of the Water Advocates program and propose any improvements.

Subgroup 3: Priority Issues and Position Statements

- Foster connection to MAs with Government Affairs Committee, focusing on the "how" of advocacy and not the "what."
- Coordinate with Government Affairs Committee to collate most important water industry issues that trickle down from the federal level to the state, local, and provincial levels.
- Provide input on implementation of position statements in conjunction with Government Affairs Committee.
- How can this committee surface position statements that are developed on the state, local and provincial levels and communicated by MAs? Through Government Affairs Committee or directly to the Board of Trustees? How can we ensure that the stakeholders are included in the review process?

Additional Consideration: Future Plans

- Since this is the third year in a row that we have a workgroup related to water advocacy, explore whether this workgroup should become a permanent committee.

Workgroup Deliverables:

- Proposed updates to the Policies and Procedures for addition of Water Advocacy Committee.
- List of best practices/ guidance for state and local government outreach.
- List of outcomes from all the efforts of the workgroup to meet the stated goals.
- Power Point presentation of outcomes including recommendations and a sample of proposed updates to the Policies and Procedures at WEFTEC 2023.

2023 WEFMAX

The 2023 WEFMAX events dates and locations are set. At these events, MAs come together, along with WEF officials, to share best practices, exchange ideas, and network. The dates and locations for 2023 are shown below. The general organization of the events is that they start at 4:00 pm on Wednesday with an icebreaker session and DEI session. Thursday is a full day focused on the theme with a social that night. Friday is where MAs share their specific experiences and challenges (although this is part of Thursday as well). The events conclude at noon on Friday.

"The 2023 WEFMAX events dates and locations are set."

April 12-14 –
St. Louis, MO
Hosted by Missouri WEA
Theme: Improving your MA Through Collaboration and Partnership.

May 3-5 –
Denver, CO
Hosted by Rocky Mountain WEA
Theme: Improving your MA Through Membership Engagement and Service.

May 24-26 –
Charlottetown, PEI, Canada
Hosted by Atlantic Canada W&WA
Theme: Improving your MA Through Leadership and Innovation.

Date To Be Determined –
Virtual WEFMAX
Theme: The Best of the Best
Central States members that have an interest or experience in one of the themes are encouraged to attend. The WEFMAX committee is seeking volunteers from MAs to share information/experiences at the events that align with each specific theme. Please let Rich or Dave know if you are interested in presenting at a WEFMAX event. Typical MA presentations are approximately 20 minutes.

Rich is considering attending the Denver, CO WEFMAX event and Dave is considering the St. Louis event. We would love to have fellow members from our MA attend with us or the other WEFMAX event.

2023 GRANT PROGRAM

Applications for round one of the MA Grant Program are now being accepted. The first application deadline was January 20, 2023. The second deadline is June 16, 2023. WEF has $125,000 in grants this year for MAs. Priority scoring for applications will be given to MA projects and initiatives that align with WEF's strategic plan.

As WEF Delegates, we are here to support you and represent the interests of the CSWEA to the House of Delegates and WEF. We are also here to serve you/CSWEA and be a liaison to WEF leadership. If something is on your mind, please feel free to call us or email us at *darnott@ruekert-mielke.com* or *rhussey@lai-ltd.com*.CS

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Setting Goals

By Jacqueline Strait

The beginning of the year usually involves lots of goal setting. However, part of meeting those goals is tweaking and reassessing them as the year proceeds. I've always liked this piece of advice: try out your goals in January and then recheck and recommit to those goals in February. In other words, it is not a one and done January activity. One of my personal goals for 2023 is to read more. To that end, I joined a neighborhood book club which will help keep me on track, and hopefully inspire me to read additional books throughout the year.

As far as setting goals, let's review some of what the MN section of the CSWEA has planned for 2023.

The MN section kicked off 2023 when the Collections Committee held their joint Winters Collection Workshop with MWOA on January 25 in Bloomington, MN. The workshop provided six credit hours to attendees and covered a variety of topics, such as: locating utility, safety, and backyard lines; fast action on FM break; sewer rehab; removing struvite; tunneling; and pipe bursting.

The Innovative Conference will be held on February 8 at the St. Cloud Rivers Edge Convention Center. The planning committee has lined up a fantastic keynote speaker, David Mann, to speak on Winning with Word: Public Communication and Engagement. The conference program highlights the main takeaways of this talk: "You *know that word of mouth is ultimately your best communication tool. But it only works when people know what to say. David illustrates how to transform vague, generic ideas into repeatable messages that makes your clients the hero and makes you their valued resource."*

After the keynote, the conference will split into three presentation tracks on Treatment and Operations Processes; Water Quality, Instrumentation, and Safety; and Collections Systems. There will also be student presentations, mini-operator innovations talks, and exhibitor presentations. The MN R2E award and MN operator of the year award will also be presented. The Young Professional Committee will host a happy hour open to all attendees following the conference. At the time that I'm writing this, the conference has already surpassed last year's registration numbers.

The Stormwater Committee is planning several socials this coming spring with the first one on March 9 at 4:00 pm at Insight Taproom and Brewery. All are welcome to attend. They are also busy helping to plan a stormwater tour for the annual conference held in Minnesota this May.

The R2E Committee is continuing to hold monthly meetings and is helping to plan an R2E workshop for the annual conference.

The 96th Annual Meeting will soon be upon us! I am very excited to see it back in person in Minnesota this year. The last time Minnesota hosted was in 2017, six years ago. It will be held in downtown Saint Paul at the Saint Paul RiverCentre from May 22-24. I am looking forward to seeing everyone there.

Finally, I want to thank you for the honor of leading the MN Section this year. It's been a wonderful experience and I know we are in great hands as we transition to new leadership in May. Welcome to our new Chair, Samidha Junghare, and Vice Chair, Mark Enochs! CS

"The 96th Annual Meeting will soon be upon us! I am very excited to see it back in person in Minnesota this year. The last time Minnesota hosted was in 2017, five years ago. It will be held in downtown Saint Paul at the Saint Paul RiverCentre from May 22-24. I am looking forward to seeing everyone there."

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37th Annual Conference on the Environment Recap

The 37th Annual Conference on the Environment was back in person this year on November 10 at the Minneapolis Convention Center. This conference is held every year in Minnesota and is jointly sponsored by the CSWEA MN section and the Air & Waste Management Association (AWMA). This year's conference had a great attendance of 220 people. The program had breakout sessions covering five tracks. The presentations focused on both technical content and the current policy issues around air, water, and waste. The keynote speaker was Katrina Kessler, the Minnesota Pollution Control Agency (MPCA) Commissioner. Katrina gave an excellent presentation that started with a review of where we have been and then moved to the upcoming policies and programs that MPCA is excited about.

The conference also held its 15th Annual Student Environmental Challenge. This year's Student Environmental Challenge asked undergraduate students to help a utility company meet their ESG and renewable energy goals by building a portfolio of carbon-free energy sources. Five student teams from St. Thomas and the University of Madison competed this year. Prior to the conference, each team had prepared a technical paper and presented a power point on their solution to a panel of expert judges. At the conference, they posted table-top displays of their work. The competition results were announced at the conference happy hour and the top three teams received cash prizes.

The CSWEA MN section would like to give a big thanks to the COE planning committee: Anna Munson, Aisha Balogh, Bryan Oakly, Quentin Hahn, Yiran Tong, Lana Tullis, Shelley Koehn, Sam Hedal, Liam Brady, Tony Colombari, Mohammed Haque, Jonah Arter, and our two conference chairs, Emma Larson and Kathryn Anderson.

The 38th Annual Conference on the Environment is already booked for this coming year on November 9, 2023. If you are interested in joining the planning committee, please reach out to Jackie Strait at *jstrait@hrgreen.com*. Hope to see you there! CS

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The Value of CSWEA

By Jillian Kiss

For most, spring is a time of new beginnings, but for us section chairs, it is a time of finality, closure, and wrapping up our year of service to our state section. I cannot believe my year as chair is nearly complete. It has been an exciting year for our section, and we are geared up for another exciting year in 2023-2024.

As our new year began, one task to accomplish is to set our 2023 budget. One of the most exciting aspects is seeing how much we give back as a section. Here is a summary of our budgeted expenses for 2023:

- $1,000 sponsorship to an AWWA/WEF Young Professionals Summit Attendee.
- $2,500 in operations challenge member sponsorships.
- $1,000 donation to Global Water Stewardship.

I am excited to share that the $1,000 sponsorship is going to Jonathan Kolweier of Baxter & Woodman, who will be representing our section at the 2023 AWWA/WEF YP Summit in Sacramento, CA on March 27-28. The $2,500 operations challenge member sponsorships were used in 2022, when we had a remarkable five CSWEA-IL members represented on the two four-person teams at WEFTEC in New Orleans! Finally, our $1,000 donation to Global Water Stewardship (GWS) will help an organized network of water and sanitation professionals in Illinois, Minnesota, and Wisconsin address the worldwide lack of access to improved sanitation. (Learn more about GWS at *www.globalwaterstewardship.org.*)

While the $4,500 in sponsorships and donations is certainly exciting, it is also a bit daunting! This $4,500 represents a level of "profit" the section needs to make from our local workshops, events, and sponsorships in order to continue the level of giving back we have become accustomed to as a section. At the same time, we work hard to provide our workshops, training, and events at as low a cost as possible to provide great value and encourage sponsorship and attendance. This year, sign up that extra coworker, go forward with that sponsorship, and share event details with your industry peers. You can be sure your registration fee will be well spent! I look forward to seeing you at an upcoming event.

A continuing theme in ensuring the future of CSWEA is the ability to encourage all members to be more active participants. You belong to a great organization. Appreciate it, support it, get involved, learn stuff, have fun. Our organization can be a voice and offer an opportunity for individuals to contribute to the continued success of our industry and be an advocate for good science and sound policies. As chair of the IL Section, I'm often asked by committee chairs how to get people more involved in their committees. Although I always encourage all members to be involved where they see fit, my recommendation to these committee chairs would be to follow the following; seek people, be persistent, learn to delegate duties so everybody has the ability to contribute, and most of all – make them feel comfortable.

In closing, I would like to thank all the committee chairs, volunteers, attendees of our events, and especially my successor, Mr. Jason Neighbors of the City of Lockport. Jason has been an extremely active member of the section, not only as Vice-Chair, but also Chair of the Operations and Safety Committee. I look forward to seeing where Jason takes our section over the coming year. CS

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Thank You

By Jake Becken

Well, this is already my last message as Chair and I am writing it just as I am starting to feel pretty good about my role as section chair! This past year has been a blur for me, especially with the arrival of our first child back in May. Life doesn't slow down, that is for sure.

Since this is my last message, I am going to step up on my soapbox for a little while. As I look forward, I am extremely encouraged about the talent and passion of many of the new professionals entering the field. That said, we simply do not have enough people entering the industry. We need more people to help design, run, regulate, and maintain our water/wastewater infrastructure. Let's face it, our facilities are becoming more and more complicated, and the skillset needed to sustain the level of services we provide our communities and the environment is ever-expanding.

I recently had a chance to talk to a few local teachers that advise some of the tech and college programs that fill many of our wastewater operator jobs. They have seen a drastic reduction in program participation through the last few years to shockingly low levels. Many economic and social pressures are out of equilibrium and can be blamed for this drop in enrollment, but it doesn't change the fact we still need talented professionals for our industry to thrive. Everyone can help with this. Work with local colleges and support them in any way possible, such as offering internships, providing tours, and assisting in class content. The more awareness and teamwork that can be built, the more people we will get interested in the industry. I know when I started in college, I didn't even know this field was an option. It wasn't until after a professor told me about a potential internship that I even considered a field in wastewater. Sometimes these small interactions are all it takes to get someone interested. According to the Bookings Institute, the US has 1.7 million water jobs, making up 1%-2% of total employment in the country. This industry is full of amazing, challenging, and rewarding jobs; we just need to get that word out.

A FEW QUICK UPDATES

The Annual Conference takes place May 22-24 at the Saint Paul RiverCentre! We have a great venue and technical program to offer, and I look forward to seeing everyone at the event. This a great opportunity to bring along a new professional you work with to show them around and introduce them to some colleagues.

The Education Seminar is also coming up on April 11 in Madison. The seminar will focus on "Making Solid Decisions in an Uncertain Future – Wastewater Solids Management." I have always found this seminar to be extremely informative and well set up for networking. Please check the CSWEA website for other upcoming CSWEA events.

In other news, I am excited to report that we are sending two YPs to the Young Professional Summit and Management Seminar this year in Sacramento, California. I am hopeful they find the experience beneficial. They plan to report back to the section on the experience at the Business Meeting in May.

IN CLOSING

Thank you for the support and dedication over this past year. So much volunteer time goes into keeping our organization strong, and it is so very much appreciated. Thank you to all of our wonderful committees that do the bulk of the work, Lindsey as our Section Secretary, Brett as our Treasurer, and Chris as our Vice Chair. Thanks to past chairs, Mary-Frances, Veronica, and Rachel, for being so receptive to my many questions along the way. To close, I would like to sincerely thank you for the chance to serve as your Section Chair – you will be in very good hands with Chris. Keep up the great work everyone! As always, reach out with any ideas, comments, or questions at *jbecken@newwater.us* or 920-438-1004. CS

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Jeremy Cramer

PWO Representative

Jeremy Cramer has been part of the wastewater industry for the past 20 years and has been an active member of CSWEA. He is a member of the 7S Society and has served various roles within CSWEA (WI Section Operations Committee Chair, WWOA Liaison to the WI Section within CSWEA, Technical Committee Chair, and Innovation and Technology Committee Chair). Jeremy is a certified water and wastewater operator in the state of Wisconsin and has earned a BS in Biology and an MS in Business Management. Currently, Jeremy is the Wastewater Conveyance and Treatment Director for the City of Sun Prairie, WI.

Alan Grooms

Treasurer

Alan Grooms has been a member of CSWEA and WEF since 2009. He has presented at the CSWEA Annual Conference, WEFTEC, the WEF Biosolids and Residuals Conference, and the WEF Nutrient Conference. Alan has served on several committees and organizing bodies, including service as the 2013 CSWEA Annual Conference Local Arrangements Chair, Wisconsin Section CSWEA Chair, as well as working on local arrangements committees and the Wisconsin Section Operations committee. Alan is a licensed professional engineer and a certified operator in the state of Wisconsin. He graduated from Iowa State University with BS and MS degrees in Civil and Environmental Engineering, and currently works as the Operations Manager at Madison Metropolitan Sewerage District, where he has been employed for more than 10 years. Prior to coming to the District, Alan worked as a consulting engineer serving municipal clients.

Anna Munson

WEF Delegate

Anna Munson has been an active member of CSWEA for more than 10 years, holding leadership positions that include Minnesota Section Chair and Young Professionals Representative. She is currently the Minnesota Section Trustee to the Executive Committee and a member of the 7S Society. She is also a member of the WEF Residuals and Biosolids Committee and has served as the Residuals and Biosolids Conference Co-chair. Anna has been a water and wastewater consultant since 2012 and is currently a Senior Principal Engineer for Hazen and Sawyer. She enjoys sharing with new engineers how the relationships she has developed through CSWEA and WEF have been critical to her growth and success as a professional engineer.

Timothy Wedin

2nd Vice President

Tim Wedin has been a member of CSWEA and WEF since 2002. He has served as Minnesota Section Chair in 2017. Tim has been a member of the Operations, Lab and Safety Committee, was the chair from 2012 to 2014 where he worked with the Committee to plan and hold the annual Innovative Approaches to Wastewater conference. Tim has served as the Local Arrangements Chair for the CSWEA Annual Meeting, and lead the Committee to plan the 2020 Annual. Tim has worked for several Engineering firms over his career in the wastewater industry, but has been working for Metropolitan Council Environmental Services since 2013, currently as an Assistant Manager in the Interceptor Engineering group. Tim has a Bachelors of Civil Engineering from the University of Minnesota. CS

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Notice of Amendments
to Bylaws and Adoption of Code of Conduct

Pursuant to Article XIV of the Central States Water Environment Association's ("Association") Bylaws, dated May 21, 2008, notice is hereby given that at the Annual Business Meeting of the Association scheduled for May 22-May 24, 2023, the membership will consider and may adopt amendments to its Bylaws and will consider and may adopt a member Code of Conduct.

Among other changes, the proposed amendments combine the Association's Constitution and Bylaws, last amended in 2008, into one document called the Association's Bylaws and move several more detailed aspects of the former Bylaws into standalone policies.

The proposed Code of Conduct would be applicable only to Association members who are not also members of the Water Environment Federation. Dual members are subject to the Code of Conduct of the Water Environment Federation.

The full text of the proposed amendments and Code of Conduct are available for review at *www.cswea.org*. CS

96th ANNUAL MEETING

Inspiring Action

MAY 22-24, 2023 • RIVERCENTRE, SAINT PAUL, MINNESOTA

PROGRAM AND REGISTRATION INFORMATION

CENTRAL STATES WATER ENVIRONMENT ASSOCIATION (CSWEA)
1021 ALEXANDRA BLVD, CRYSTAL LAKE, IL 60014 USA
WWW.CSWEA.ORG • 855-692-7932

SAINT PAUL RIVERCENTRE

WEIRD SCIENCE

38TH ANNUAL TRI-STATE SEMINAR

South Point Hotel & Casino | Las Vegas, NV

August 7-10, 2023

WEIRD SCIENCE - PREDICTING AND PROTECTING HUMAN HEALTH AND THE ENVIRONMENT

ALL UNDER ONE ROOF

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- SPECIAL TOURS AND ADD-ON WORKSHOPS FOR NEW TRAINEES AND EXPERIENCED OPERATORS
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REGISTRATION RATE

$99 PER PERSON
($125 AFTER JULY 14, 2023)

GROUP NAME: TRI-STATE SEMINAR 2023
ROOM RATE: $85 / NIGHT
DATES: AUGUST 7-10, 2023
GROUP CODE: TRI2023 (1ST THREE ARE LETTERS, LAST FOUR ARE NUMBERS)
CUT-OFF DATE: 7/14/2023

Welcome to the 96th ANNUAL MEETING

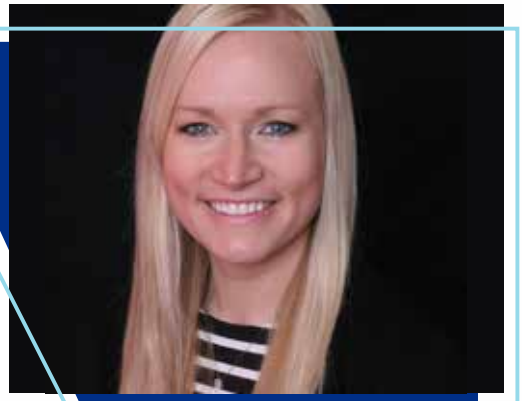
The Local Arrangements Committee (LAC) is excited to bring you the 96th Annual Meeting that will be held at the Saint Paul RiverCentre in downtown Saint Paul, Minnesota. The conference theme this year is Inspiring Action. This aligns with our focus areas for the organization that includes; mentoring and engaging our emerging leaders, thinking big, having bold ideas and being brave enough to implement them and taking action - don't underestimate the impact of small actions.

You will have many opportunities to take action, inspire action and will be inspired by others to take action throughout this year's Annual Meeting. These opportunities include; participating in a service project, donating to the silent auction to support the GWS program and their mission to provide clean water for all, learning what others are doing to inspire action within their organizations, getting to know our emerging leaders better, learning about a new process or product, acting as a mentor, gaining a mentor… there are endless opportunities throughout the three day event for action. The ultimate opportunity is networking. One conversation can spark an idea that could have tremendous impacts.

The Technical Program Committee received over 100 abstracts and the best of the best were chosen to be part of the program. There will also be other tracks focusing on Ethics, Resource Recovery, Stormwater and an Operators Training Track.

The meeting is scheduled to begin on Monday, May 22 and will continue through Wednesday, May 24. There will be two conference hotels; the historic Saint Paul Hotel or the modern Hampton Inn. Both are within a block of the Saint Paul RiverCentre and located near many great restaurants, the Science Museum (an ultimate location to check out for us science enthusiasts), beautiful parks, the Mississippi River and so much more. We received great rates for both locations. Be sure to book early.

Be sure to check out the details within this Registration Brochure for all the fun and exciting opportunities you have to pick from. On Monday, there will be a tour of Saint Paul's Wastewater Treatment Facility, a service project at a City park that includes an invasive species pull, the Stormwater tour that always exceeds expectations, a fun tour meet up event that includes



trivia, and so much more. The Meet & Greet/Social event will be held outdoors, weather permitting, at RiverCentre's outdoor pavilion area. There will be a plan B location within RiverCentre if the weather decides to not cooperate with us.

Tuesday and Wednesday will be filled with the opportunity to learn and be inspired during the technical program and at the exhibitor hall. There will be a keynote address by Chief Matthew Love, a national renowned speaker bright and early on Tuesday morning at 8am.

In this high energy keynote presentation, Chief Love applies traditional leadership principles with a fresh perspective to equip and inspire teams in creating a motivational environment. Chief Love provides examples through story and illustration, enabling the leader to channel passion and take action which promotes team dynamics and the achievement of big goals.

There will be an Awards Banquet on Tuesday evening to recognize the amazing organizations and individuals who go above and beyond in our industry. Be sure to come for the pre- and post- reception. Last year we had record breaking attendance at the Banquet event, and we are hoping to see even more at this year's event.

The LAC are so excited to bring you an incredible event that you will not want to miss! A special thank you to our LAC Chair, Liz Kramer, the technical program committee, and the rest of the committee for their endless amount of work they have put into making this event a success.

Looking forward to seeing you all there!

Local Arragements Committe

Tracy Hodel	City of Saint Cloud	2022-2023 CSWEA President
Liz Kramer	City of Saint Cloud	2022 LAC Chair
Colin Fitzgerald	Jacobs	Technical Committee Chair
Shanna Czeck	City of Saint Cloud	Speaker Search Chair
Michael Quamme	Apex Engineering	Exhibits Chair
John Chlebeck	Met Council	Silent Auction Chair
Tim Korby	HR Green	Sponsorships
Jackie Strait	HR Green	Conference Advisor
Emma Larson	City of Saint Cloud	Technical Committee
Scott Molinex	Enviromenx	5k Run/Walk Chairperson
Sam Lobby	WLSSD	Social Program Chair
Samidha Junghare	WLSSD	Catering Chair
Ryan Kotta	Apex Engineering Group	Golf Outing
Susan Danzi	SEH	Printing and Signage Chair
Jeny Baroda	Met Council	YP/Community Service Project
Anton Yochum	Victaulic	Stormwater Tour Chair
Ryan Kibler	SEH	A/V Chair
Anndee Huff Chester	Brown & Caldwell	Student Design Chair & YP Chair
Quentin Hahn	Burns & McDonell	Student Design Chair & YP Chair
Anna Munson	Hazen & Sawyer	Registration
Kyle Sandberg	HR Green	Registration

Executive Committee

- President, Tracy Hodel
- 1st Vice President, Amy Underwood
- 2nd Vice President, Troy Larson
- Treasurer, Alan Grooms
- Immediate Past President, Jane Carlson
- WEF Delegate '22-'25, Rich Hussey
- WEF Delegate '23, David Arnott
- PWO Representative '23, Matt Streicher
- YP Representative '22-'24, Anndee Huff Chester
- Minnesota Section Trustee '24 Anna Munson
- Illinois Section Trustee '23, Chris Marschinke
- Wisconsin Section Trustee '23, Rachel Lee
- Executive Management, Amy Haque and Mohammed Haque

Conference at a Glance

96th ANNUAL MEETING

Monday, May 22		Location	Room
1:00 - 3:30	Golf Outing	Top Golf, Brooklyn Park	---
12:30 - 4:00	Stormwater Tour	Highland Bridge and MSP Airport	---
1:00 - 4:00	Treatment Facility Tour	Metro WWTP - Saint Paul	---
1:00 - 4:00	YP Community Service Project	Silverwood Park - 3 Rivers Park District	---
4:00 - 5:30	Tour Meet Up and Trivia	Amsterdam Bar and Hall	---
6:00 - 6:30	Global Water Stewardship Annual Meeting	Amsterdam Bar and Hall	Main Floor
6:30 - 10:00	Social / Meet & Greet	Saint Paul RiverCentre	Outdoor Pavalion RiverCentre

Tuesday, May 23		Location	Room
6:00 - 7:15	5k Run/Walk	Starting Location: Science Museum of Minnesota	---
8:00 - 9:00	Opening Session and Keynote	Saint Paul RiverCentre	Ballroom BCD
9:00 - 6:00	Exhibits	Saint Paul RiverCentre	Ballroom A-E/Concourse
9:00 - 9:15	Morning Break	Saint Paul RiverCentre	Concourse
9:15 - 10:15	Technical Sessions	Saint Paul RiverCentre	Meeting Rooms 2-11
10:15 - 11:00	Exibits Only	Saint Paul RiverCentre	Ballroom A-E
11:00 - 12:00	Technical Sessions	Saint Paul RiverCentre	Meeting Rooms 2-11
12:00 - 1:00	Exhibitor Lunch	Saint Paul RiverCentre	Ballroom A-E / Concourse
1:00 - 2:30	Technical Sessions	Saint Paul RiverCentre	Meeting Rooms 2-11
2:30 - 3:00	Poster Sessions 1, Afternoon Break	Saint Paul RiverCentre	Concourse
3:00 - 4:00	Technical Sessions	Saint Paul RiverCentre	Meeting Rooms 2-11
4:00 - 6:00	Exhibitor Reception	Saint Paul RiverCentre	Ballroom A-E / Concouse
4:00 - 4:15	76 Meeting	Saint Paul RiverCentre	Meeting Room 2
4:15 - 4:30	Golden Manhole Society	Saint Paul RiverCentre	Meeting Room 4
6:30 - 7:00	Pre-Awards Reception	Saint Paul RiverCentre	Ballroom BCD
7:00 - 9:00	Annual CSWEA Awards Event	Saint Paul RiverCentre	Ballroom BCD
9:00 - 10:00	Post Awards Celebration & Networking Event	Saint Paul RiverCentre	Ballroom BCD

Wednesday, May 24		Location	Room
7:00 - 7:45	State Section Meetings	Saint Paul RiverCentre	Meeting Rooms 12-14
7:45 - 8:30	Annual Business Meeting	Saint Paul RiverCentre	Meeting Rooms 12-14
8:30 - 9:30	Technical Sessions	Saint Paul RiverCentre	Meeting Rooms 2-11
8:00 - 12:00	Exhibits	Saint Paul RiverCentre	Ballroom A-E / Concourse
9:30 - 10:30	Poster Sessions II, Morning Break	Saint Paul RiverCentre	Concourse
10:30 - 12:00	Technical Sessions	Saint Paul RiverCentre	Meeting Rooms 2-11
12:10	Silent Auction Bids Due	Saint Paul RiverCentre	Exhibitor Concourse
12:00 - 1:00	Luncheon and Networking	Saint Paul RiverCentre	Ballroom B-C-D
1:00 - 3:00	Technical Sessions / Ethics / Ops Training	Saint Paul RiverCentre	Meeting Rooms 2-11

Registration Hours		Location
11:00 - 5:00	Monday, May 22	Saint Paul RiverCentre, Concourse
6:30 - 9:00	Monday, May 22	Saint Paul RiverCentre - Meet & Greet. Outdoor Pavalion
8:00 - 5:00	Tuesday, May 23	Saint Paul RiverCentre, Concourse
8:00 - 3:00	Wednesday, May 24	Saint Paul RiverCentre, Concourse

Exhibit Hall Hours		Location
9:00 - 6:00	Tuesday, May 23	Exhibit Hall Open
9:00 - 12:00	Wednesday, May 24	Exhibit Hall Open

Conference Highlights

Monday, May 22

MEET & GREET
Saint Paul RiverCentre Outdoor Pavillion | 6:30 - 10:00 pm

Kickoff the Annual Meeting with a fun, outdoor social gathering to network with your fellow water quality professionals at the inviting outdoor space behind the Saint Paul RiverCentre. · Arrive to the back entrance by going through Rice Park, or enter through the conference hall by taking the exit doors nearest to the downstairs cafe. Registration will be setup at the entrance - remember to get your drink tickets that will be included with your registration badge and come hungry! Plenty of food options await. We look forward to seeing you, whenever you can make it.

Tuesday, May 23

JIM SHAW MEMORIAL 5K RUN / WALK
Starting Location: Science Museum of Minnesota – located just across the street from the RiverCentre.

120 W Kellogg Blvd., Saint Paul, MN | 6:00 - 7:30 am

Meet in front of the Science Museum of Minnesota (120 W Kellogg Blvd.) for the 5k run/walk along the Mississippi River. Course details will be provided at registration. The course will be an out-and-back in beautiful Saint Paul long and Mississippi River. Enjoy the 2023 race route and run along with your friends and fellow water professionals, enjoying the camaraderie before the conference day begins.

OPENING SESSION AND KEYNOTE ADDRESS
Ballroom B,C,D | 8:00 - 9:00 am

Chief Love serves as Fire Chief in St. Cloud, MN. In addition to Minnesota, he has held a variety of positions in the Colorado and Florida fire services. Chief Love's career has been strongly focused on the power of an organization's mission, vision and values and incorporates the ownership of these core elements into his presentations.

In this high energy keynote presentation, Chief Love applies traditional leadership principles with a fresh perspective to equip and inspire teams in creating a motivational environment. Chief Love provides examples through story and illustration, enabling the leader to channel passion and take action which promotes team dynamics and the achievement of big goals.

TECHNICAL SESSIONS
Meeting Rooms 2-11 | 9:15 - 10:15 am, 11:00 - 12:00 pm, 1:00 - 2:30 pm, 3:00 - 4:00 pm

For more information, please see the Technical Program.

EXHIBITS
Ballroom A-E/Concourse | 9:00 - 6:00 pm

Exhibits showcasing the latest technology in wastewater, collection systems, treatment and many related items will be on display. Be sure to visit our fine exhibitors and thank them for their support of our Association.

EXHIBITOR LUNCH
Ballroom A-E | 12:00 - 1:00 pm

The Exhibitor Lunch offers exhibitors and conference attendees to meet in a relaxing and social environment. Please visit Ballroom A-E, where the Exhibitor Lunch will be held.

POSTER SESSION 1
Ballroom A-E / Concourse | 2:30 - 3:30 pm

Posters will be on display in the Ballroom A-D/Concourse. Presenters will be available at their posters at this time to discuss their posters and answer questions. Please stop and visit.

EXHIBITOR RECEPTION
Ballroom A-E / Concourse | 4:00 - 6:00 pm

Light snacks and refreshments (remember to bring your drink tickets included in your registration packet) will be provided in the Exhibit Hall. Share some refreshments and visit with our exhibitors, and thank them for attending this year's Annual Meeting.

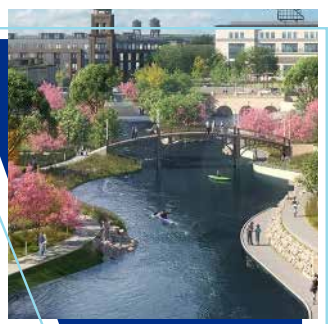
Tuesday, May 23

TOP GOLF EVENT

Top Golf
6420 N
Camden Avenue
1:00 - 3:30 pm

Top Golf is a golfing game and venue that anyone can play (and win), regardless of their golfing experience. The range is set up to allow for interactive play, with both technology and a physical set up that will allow for more engaged interaction with your friends, colleagues, and fellow golfers. Each player scores points by hitting micro-chipped golf balls at giant dartboard-like targets on an outfield. The closer you get your ball to the center or 'bullseye' and the further the distance, the more points earned.

GREEN STORMWATER INFRASTRUCTURE CAPITOL CITY TOUR



Saint Paul and
Minneapolis
Stormwater Tour
12:30 - 4:00 pm

This approximately 3-hour bus tour will visit new green stormwater infrastructure installations in Saint Paul. The tour will include a variety of water quality treatment practices that include stormwater reuse, bioinfiltration, and underground filtration. The tour will include the recently-constructed 122-acre Highland Bridge development and associated water treatment features, including a stream that was daylighted almost 100 years after it was buried in a pipe. The tour also anticipates stops at a LEED Gold office building that incorporates rainwater reuse and innovative stormwater management as well as a beautiful new City of Saint Paul Public park that includes a unique water feature that pumps stormwater through the park in a channel that is integrated with passive and active recreation areas, and signage to explain the importance of and celebrate water.

Transportation will be provided.

TREATMENT FACILITY TOUR

Metro WWTF
1:00 - 3:00 pm

MCES's Metropolitan Wastewater Treatment Facility is the largest plant in Minnesota, treating an average flow of 180 + 72 MGD. The plant includes enhanced biological phosphorus removal in its liquid treatment train and state of the art incineration, air pollution control, and energy recovery in its solids management process. In addition, the facility includes MCES's centralized maintenance facilities, the analytical laboratory serving all MCES facilities, and extensive odor control measures to ensure it is a good neighbor to the surrounding community. The tour will provide a wide-range overview of this impressive facility, it will include specific stops at highlights and unique features of the facility, and it will provide an opportunity to discuss relevant topics with staff involved in its operation, optimization, and capital planning.

After the tour, attendees will gather with friends from the stormwater tour. Carpooling is encouraged.

COMMUNITY SERVICE PROJECT

Silverwood Park
3 Rivers District Parks
12:30 - 4:00 pm

Volunteer to help with an invasive species pull at Silverwood Park. Work with other CSWEA volunteers to network, socialize, and most importantly - help take action to help improve the environment.

For more information about this year's project, contact Quentin Hahn • *qahahn@burnsmcd.com*

POST TOUR TRIVIA MEET UP

Amsterdam Bar and Hall | 4:00 - 6:00 pm

Enjoy a time to socialize and test your knowledge at Amsterdam Bar & Hall, just a short walk from the Saint Paul RiverCentre. Trivia will start at 4:30 and is free for attendees. Join a team or try it solo.

All tours and service projects will wrap up at this trivia event!

Drinks and food will be available for purchase.

Conference Highlights

Tuesday, May 23

CSWEA ANNUAL AWARDS EVENT
Ballroom B,C,D | 7:00 - 9:00 pm

6:30 to 7:00 p.m - Pre Awards Social Reception. Connect with friends and enjoy refreshments before the Awards Banquet.

7:00 to 9:00 pm - Awards Presentations. Hear updates about CSWEA activities from the outgoing president, the vision for the year ahead from our incoming president, and honor this year's award winners for the many WEF and CSWEA Awards presented to the very best of our industry.

The Annual CSWEA Awards Event is a ticketed event and includes a meal. Please remember to purchase a ticket and bring the ticket to the event.

9:00 to 10:00 pm - Post Awards Reception and Celebration
Celebrate awards nominees, award recipients, students and emerging leaders. Spend time with friends and colleagues honoring our water work.

Wednesday, May 24

STATE SECTION BUSINESS MEETINGS
Meeting Rooms 12-14 | 7:00 - 7:45 am

Please attend your respective State Section's business meeting to be updated on the activities of the Section and its committees. Don't miss this opportunity to get involved and find out where you can help your Section. This is a ticketed event and includes a meal. Please remember to purchase and bring your ticket with you.

CSWEA ANNUAL BUSINESS MEETING
Meeting Rooms 12-14 | 7:45 - 8:30 am

The Association Business Meeting will include reports from the Association Committees and Sections and the annual election of officers. We encourage everyone to attend and learn about our associations activities. Everyone is welcome!

EXHIBITS
Ballroom A-F / Concourse| 9:00 am - 12:00 pm

Exhibits showcasing the latest technology in wastewater, collection systems, treatment and many related items will be on display. Be sure to visit our fine exhibitors and thank them for their support of our Association.

TECHNICAL SESSIONS
Meeting Rooms 2-11
8:30 - 9:30 am, 10:30 - 12:00 pm, 1:00 - 3:00 pm
For more information, please see the Technical Program.

POSTER SESSIONS II
Ballroom A-F / Concourse| 9:30 - 10:30 am

Posters will be on display in Ballroom A-F / Concourse. Presenters will be available at their posters at this time to discuss their posters and answer questions. Please stop and visit.

SILENT AUCTION
Exhibitor Concourse

Global Water Stewardship (GWS) was founded to advance solutions, and has a mission to resolve sanitation issues in developing countries by educating people and engineering sustainable solutions that keep waterways clean and communities healthy.

All of the work of GWS is implemented by volunteers, and depends on the support of donors. Central States continues to recognize the importance of the work done by GWS, and supports GWS through proceeds from the silent auction at the Annual Meeting.

john.chlebeck@metc.state.mn.us

CSWEA LUNCHEON & NETWORKING
Ballroom B,C,D | 12:00 - 1:00 pm

Everyone is invited to the annual CSWEA Luncheon! Eat, drink and enjoy a meal with colleagues. This is a chance to network and engage with fellow water professionals, students, and emerging professionals.

This is a ticketed event and includes a meal. Please remember to purchase and bring your ticket with you.

Technical Program

96th ANNUAL MEETING

Tuesday May 23

	Session A **Nutrient Removal**	Session B **Residuals and Sidestream Nutrient Management**	Session C **Implementation**	Session D **Wetweather Management**	Session E **Conveyance**
Moderator					
9:15-9:45	Improving Total Nitrogen Removal in Facultative Wastewater Treatment Ponds in Greater Minnesota via Predictive Wastewater Treatment **Rachel Tenney, University of Minnesota**	Why La Crosse selected the Orege Thickening Technology **Jared Greeno, City of La Crosse**	Wastewater Development in the Land of Pura Vida **Liz Heise, Trotter & Associates**	Don't Settle (for Less): High-rate Deep-Bed Filtration Demonstrates Potential for Retrofittable Enhancement of Primary and Wet Weather Treatment with Carbon Diversion and Resilience Benefits at a Large Wisconsin Utility **Jon Liberzon, Tomorrow Water**	Pipe Rehabilitation Benefiting the Community and the Environment **Jackie Strait, HR Green**
9:45-10:15	A Tale Of Two Facilities – Startup Of Fox River WRD Nutrient Removal Upgrades **Steve Arant, Black & Veatch**	City of St. Cloud and Tri-County Solids Waste Commission Food Waste to Energy Pilot Program **Shanna Czeck, City of St. Cloud**	Over 100,000 Diffusers Across 28 Basins: The Milwaukee MSD South Shore WRF Aeration Upgrade Story **Lindsey Busch, Carollo Engineers**	Two-for-One Special: Solving Ely, Minnesota's Tertiary & Wet Weather Treatment Needs with a Single Technology **Jayme Klecker, AE2S**	Interceptors 1-SP- 200/201 Rehabilitation **John Chlebeck, MCES**
10:15-11:00	Break				
11:00 - 11:30	Low DO BNR – Modeling and Design **Eric Redmond, Black & Veatch**	Get that Phosphorus Out the Door! Dewatering Undigested TWAS at the Otsego East WWTF **Seth Wilkes, City of Otsego**	Case Study: Main Pump Station Startup and Optimization **Samuel Cotter, HR Green**	Storage Basin Sizing Based on Risk: How Often Will the Tank Fill? Or Overflow? **David Perry, Brown and Caldwell**	Using Collection System Modeling and Data Analysis to Find Cost Effective Solutions to Anecdotal Problems **Stephen Sticklen, Donohue & Associates**
11:30-12:00	Utilizing the Revolving Algal Biofilm (RAB) System to Meet Nutrient Limits **Jens C Dancer, Gross-Wen Technologies**	Full-scale Performance Comparison of Sidestream Nitrogen Removal Processes Prevalent in the United States **George Kontos, Carollo Engineers, Inc.**	Progressive Design-Build Delivery for the $220 Million Saint Paul Water Plant Improvements Project **John Borghesi, Jacobs**	Flood Resiliency Improvements at Jones Island Water Reclamation Facility **Allen Williams, Donohue & Associates, Inc.**	How Smart is Your Sewer? Two Resilient Collection Systems Use Real-Time Sewer Monitoring to Track I&I and Avoid Spills **Cody Schoepke, Fond du Lac WTRRF & Tim Graeb, Smart Cover Systems**
Lunch					
	Session F **Advancements in BNR**	Session G **Biogas/Heat Recovery**	Session H **CECs/Industrial**	Session I **Preliminary/Primary Treatment**	Session J **Stormwater**
Moderator					
1:00-1:30	State-Of-The-Art Technology Demonstration of Energy-Efficient Secondary Treatment Using Model Predictive Aeration Control, High Efficiency Blower Technology, and Suboxic Nutrient Removal **Natalie Beach, Carollo Engineers**	Digester Gas – New Technologies, New Markets, New Thinking **Randy Wirtz, Strand Associates, Inc.**	Future Planning for Emerging Contaminants: Making Technology Decisions Today with a Vision for Future Treatment Needs **Scott Gilbertson, Alexandria Lake Area Sanitary District**	Grit Chamber Improvements: A Case Study **Alan Grooms, Madison Metropolitan Sewerage District**	Urban Watershed Models – Continuing to Use Them After the Project is Complete **Caroline Burger, City of Madison**
1:30-2:00	Simultaneous Nitrification/ Denitrification: The Next Phase of BNR **Ben Brooks, City of Wausau**	Biogas to RNG – Fueling the Fleet **Curt Schiesl, Unison Solutions**	Embedded Technology for Chloride Source Identification **Susan Danzl, Short Elliott Hendrickson Inc.**	Innovative Techniques to Quantify and Characterize Grit Removal in Milwaukee **Ben Burroughs, Arcadis**	Towards Eliminating Phosphorus-Related Impairments – NARP Case Studies **Nigel Pickering, Geosyntec Consultants**
2:00-2:30	Break				
2:30-3:00	Sludge Settling, Low Dissolved Oxygen, and Selector Zones: Important Factors for Low Energy Activated Sludge **Matt Seib, Madison Metropolitan Sewerage District**	Heat Recovery: Technical Feasibility and Case Studies for Decarbonizing Heating Needs **Trevor Prater, MCES**	Mainstream Suspended Air Flotation Clarification for Removal of Intermittent High Strength Waste at a Municipal WWTP **Patrick Haney, Stanley Consultants**	Alternatives for Conventional Primary Treatment with Space Limitations **Thomas Treacy, Milwaukee MSD**	Green and Healthy Schoolyard Redevelopments at Milwaukee Public Schools **Kara Koch, Stormwater Solutions Engineering, LLC**
3:00-3:30	When Densification is Desirable **Adam Markos, Black & Veatch**	Innovations in St. Cloud, MN – Fuels of the Future **Tracy Hodel, City of St. Cloud**	Sustainability Contributions of Oxygenation on Sulfide and Methane Prevention, An Oxygenation Case Study: Home-town Paper Mill and City of Grand Rapids, MN **Ryan Grimes, ECO Oxygen Technologies**	Enhanced Primary Filtration to Unlock Capacity and Improve Sustainability **David Diehl, Black & Veatch**	How a Decade of GSI Maintenance Experience Informs Improved GSI Designs **Ryan Fucci, HDR Inc.**

Technical Program

Wednesday May 24

	Session K **PFAS (Special Session)**	Session L **Research/Novel Approaches**	Session M **Stormwater**	Session N **Operational Optimization**
Moderator				
9:00-9:30	Removing and Destroying PFAS at Minnesota Municipal Water Resource Recovery Facilities is Unaffordable **Becca Vermace, Barr Engineering and Anna Munson, Hazen and Sawyer** Impact of Several Biosolids Stabilization Technologies on PFAS **Todd Williams, Jacobs**	EcoRecover Process Characterization: Intensive Microalgal Cultivation for Nutrient Recovery from Municipal Wastewater **Hannah Molitor, University of Illinois Urbana-Champaign**	A Collaborative Vision: Regional Stormwater Management at 325 Blake Road **Michael Ryan, HDR Engineering**	Innovative Does Not Mean Expensive: Demonstration Testing of BNR Concepts at the Wheaton Sanitary District **Matt Larson, Wheaton Sanitary District**
9:30-10:00	Transformation of PFAS during Pyrolysis of Biosolids **Patrick McNamara, Marquette University and Black & Veatch**	Novel Nutrient Recovery Process from Wastewater Treatment Plants **Daniel Jurado Pineda, University of Minnesota**	Designing GSI to Adapt with a Changing Climate **Benjamin Crary, Hazen and Sawyer**	Operation Reviews Aid in Selection of Emerging Technologies – Lessons Learned from Three Projects **Troy Larson, Strand Associates**
	Break			
11:00-11:30	Continued PFAS Destruction Testing on Biosolids Biological Drying and Pyrolysis System **Valentino Villa, Bioforcetech**	Suspended Air Flotation Case Studies **Christina Skalko, PE, SEH, Inc.**	TBD	Coming Off the Bench: Value of Bench-Scale Testing for Nutrient Removal Design **Jennifer Loconsole, Black & Veatch**
11:30-12:00	The Fate of PFAS Through Pyrolysis Systems Treating Biosolids **Lloyd Winchell, Brown and Caldwell** Panel Discussion (30 min)	Grit Assisted Patch (GAP) for Road Pothole Fast Repair **Baolin Wan, Marquette University**	TBD	Fine Tuning the Nutrient Removal Process in South Beloit **Matthew Johnson, Fehr Graham**
12:00-1:00	Lunch			
	Session O **R2E**	Session P **Management**	Session Q **Operations Track**	Session R **Ethics Track**
Moderator				
1:00-1:30	What Are You Doing With YOUR Carbon?	WIFIA to the Rescue: Funding $267 Million in Treatment System Upgrades in Bloomington, IL **Eric Callocchia, NewGen Strategies and Solutions, LLC**	TBD	TBD
1:30-2:00		Owatonna's Financial Planning for Major WWTP Expansion **Eric Meester, Nero Engineering and Jacob Strombeck, AE2S**		
2:00-2:30	Break			
2:30-3:00	What Are You Doing With YOUR Carbon?	Yes, We Planned for the Next 80+ Years: Site Layout and (some) Permitting Through Buildout **Kurt Neidermeier, City of Otsego**	TBD	TBD
3:00-3:30		Operations & Maintenance Role in Asset Preservation **Scott Smrekar, Metropolitan Council Environmental Services**		

KEY NOTE PRESENTER

Matthew Love

Fire Chief Matthew Love has served the emergency services community for more than 20 years with the support of his wife Kristen and sons, Tyler and Noah. Chief Love has served as a Fire Chief since 2009 for multiple organizations and is currently the Fire Chief for City of St. Cloud MN.

Prior to joining St. Cloud, Chief Love was the Fire Chief of the Fort Myers Beach Fire Department. A graduate of the United States Fire Administration's National Fire Academy Executive Fire Officer Program, he has also earned the distinguished Chief Fire Officer Designation by the Center for Public Safety Excellence. Chief Love is a recent graduate of the Harvard Kennedy School, earning a Harvard Executive Certificate in Public Leadership.

He holds a Master of Science Degree in Leadership with an Emphasis in Disaster Preparedness and Executive Fire Leadership, graduated Summa Cum Laude with a Bachelor of Science degree in Public Safety and Emergency Management, holds an Associate Degree in Fire Science Technology, and an Associate Degree in Wildland Fire Science.

Teaching a variety of fire science courses, Chief Love spent several years as an adjunct professor for the Colorado Community College system. He also teaches courses in leadership, customer service, and firefighter safety. He speaks nationwide at various leadership events and has had the honor of being a reoccurring speaker for the United States Air Force Academy Character and Leadership programs.

Chief Love's career has been strongly focused on training, departmental training program management, and building training and leadership platforms. He is a strong believer in the power of an organization's mission, vision and values, and provides presentations on shared vision and inspirational leadership for both fire and non-emergency service agencies. He has made it a priority for team members to share in organizational vision and to take ownership of the organization's values and mission creation, continuously focusing on the fire service spirit of service.

In this high energy keynote presentation, chief love applies traditional leadership principles with a fresh perspective to equip and inspire teams in creating a motivational environment. Chief love provides examples through story and illustration, enabling the leader to channel passion and take action which promotes team dynamics and the achievement of big goals.

Operators Track

Moderator
Tim Hewett
City of St. Cloud, MN

Moderator
Dianne Mathews
Western Lake Sanitary Sewer District

Though this track is designed for operators, all with an interest in wastewater operations are welcome and encouraged to attend. This track is focused on collection system operations.

The Operators track schedule will include content on "Augmenting Operations with Evolving Technologies," opportunities to network with other operators, and a Panel Discussion that will touch on a wide variety of topics with regards to "Designing and Operating Your Collections System for the Future." There will also be opportunities for questions and discussion.

OPERATORS TRACK SCHEDULE - MAY 24, 2023

1:00 - 1:45 Augmenting Operations with Evolving Technologies
1:45 - 2:00 Break and Operator Networking
2:00 - 3:00 Panel Discussion on "Designing and Operating Your Collection System for the Future"
- Master Planning
- Collaborating with Private Developers
- Design Lifecycle

Tim Hewett is the Infrastructure Services Manager for the City of St. Cloud, MN. Tim is an experienced Infrastructure Services Manager with a demonstrated history of working in the utilities industry, as well as a Regional Director of MnWARN.

Dianne Mathews is a Professional Engineer at the Wester Lake Sanitary Sewer District in Duluth, MN. She is an experienced Project Engineer with a demonstrated history of working in the environmentall services industry.

Panel Participants will include collection system professionals, who can speak to a diversity of experiences in managing and operating collections systems.

SPECIAL GUEST
Keith Hobson, P.E.,BCEE
WEF Treasurer

Water Environment Federation
the water quality people®

Keith L. Hobson is the 2020-2023 Treasurer for the Water Environmental Federation (WEF), an international organization of water quality professionals headquartered in Alexandria, VA.

Keith is the Past President / CEO of FOX Engineering Associates in Ames, Iowa and has over 40 years of experience as a consultant in the field of environmental engineering for both municipal and industrial clients. He also served with Black & Veatch for more than 13 years and has been involved in design of water and wastewater treatment facilities ranging in capacity from 2 mgd to over 400 mgd.

A WEF member since college, he served as speaker of the House of Delegates (HOD) in 2018-2019 and served for two terms on the HOD as a representative of the Iowa Water Enviroment Association (IAWEA) and as a delegate at large. He has served as chair or vice chair of the WEF Audit and Finance committees. He also serves on the WEF Goverment Affair Committee.

Keith has been a member of IAWEA, serving on many committees, chairing the newsletter/publications committee and financial review committee and consulting with IDNR on regulatory issues. He also served as chair of the newspaper committee for the Kansas WEA prior to moving to Iowa. He has authored many reports and presented technical papers on various topics in environmental engineering.

Keith holds degrees in civil engineering from Iowa State University (B.S.) and University of Missouri-Columbia (M.S.) He is a Board Certified Environmental Engineer (BCEE) through the American Academy of Environmental Engineers and a member of the Select Society of Sanitary Sludge Shovelers. Keith is a registered professional engineer in Iowa and multiple other states. He is a recipient of the Arthur Sidney Bedell Award and the Kenneth J Miller Founders Award.

About WEF

The Water Environment Federation is a non-for-profit technical and educational organization of 35,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals; enrich the expertise of the water professionals; increase the awareness of the impact and value of water; and provide a platform for water sector innovation. To learn more, visit *www.wef.org.*

SAINT PAUL RIVERCENTRE
175 West Kellogg Boulevard | Saint Paul, MN 55102

The conference will be held at Saint Paul RiverCentre in Saint Paul, MN. Renowned for its leadership in sustainability, the venue was designed by Hammel Green and Abrahamson, Inc. and is a renowned location for events of all types. It was the first building to achieve sustainability certifications from LEED, Green Globes and APEX/ASTM, and part of a campus that was one of the first venues to offer front of house organics composting to its guests. For more information, go to *www.rivercentre.org*.

Accommodations

THE SAINT PAUL HOTEL
350 Market Street, Saint Paul, MN 55102

THE HAMPTON INN
200 7th St. W, Saint Paul, MN 55102

The Saint Paul Hotel and the Saint Paul Hampton Inn are the official Conference Hotels. Rooms are available for reservations at the The Saint Paul Hotel, 350 Market Street, Saint Paul, MN 55102 (*www.saintpaulhotel.com*) and the Hampton Inn & Suites Downtown Saint Paul, 200 7th St. W, Saint Paul, MN 55102.

HAMPTON INN:
Book a standard room for the CSWEA rate of $139.
Valet Parking: $24/day.
Visit: *www.hilton.com/en/book/reservation/deeplink/?ctyhocn=MSPDOHX&groupCode=CHHCSW&arrivaldate=2023-05-21&departuredate=2023-05-24&cid=OM,WW,HILTONLINK,EN,DirectLink&fromId=HILTONLINKDIRECT*

Guests can also call the hotel direct at 651-224-7400 and mention the CSWEA Group Block. The group code is (CSW).

SAINT PAUL HOTEL:
Visit *www.saintpaulhotel.com* and then in the below fields enter the following:

- Date Range
- Drop-down for Rate Type - choose "I HAVE CODE" and then Group/Block
- Enter the group code in CODE - 52123CSWEA
- Guests can also call 800-292-9292 and ask for the CSWEA 2023 ANNUAL CONFERENCE RATE.

EXHIBIT HALL

The Exhibit Hall will be open two days: Tuesday and Wednesday, May 23 and 24. Dedicated exhibit times on Tuesday include 10:15 to 11:00 am, at lunch from 12:00 to 1:00 pm and at the reception from 4:00 to 6:00 pm; as well as poster session periods both days. As well, the conference provides longer breaks during the technical sessions with refreshments in the exhibit hall.

CURRENT EXHIBITORS

- 96 AM Exhibitors
- AE2S
- AllMax Software
- Andritz
- Apex Engineering Group
- Barr Engineering
- Boerger
- Bolton & Menk
- Brierley Associates
- CB&I Storage Tank Solutions
- Clean Water Technology
- CUES
- DN Tanks
- EcoVerde
- Electric Pump
- Energenecs
- Foth Infrastructure and Environment
- GPM
- Great Northern Environmental
- Headworks Inc.
- HR Green
- Interstate Power Systems
- JDV Equipment
- Jim Jolly Sales
- Kodru Mooney
- Mead & Hunt
- Miller Mechanical Specialties
- MNX
- Mulcahy Shaw Water
- Orenco
- Park Process
- Purafil
- Rebuild-It Services Group
- RockWater Equipment
- SDMC America Technology
- SEH
- Shand & Jurs Biogas
- Sherwin Williams
- Siemens
- SmartCover Systems
- Strike Products
- Synagro Technologies
- TKDA
- Triplepoint
- Unison Solutions
- USALCO
- VEGA
- Vessco
- Visu Sewer
- Waterly
- Watersolve

UTILITY & REGULATOR PRICING

SEND MORE PEOPLE AND STILL SAVE MONEY!

UTILITY & REGULATOR REGISTRATION PRICING

Based on the success in past years, CSWEA will continue to offer flat rate utility pricing for the Annual Meeting. The pricing allows utilities to pay a flat.fee for registration with the cost determined by their treatment plant design size. For that price, a utility may send as many people as they won't to the annual meeting. The utility would still have to purchase event and meal tickets separately for each individual. The only included meals would be the continental breakfasts, coffee/ snacks, and box lunch. This pricing structure is also being offered this year to regulatory agencies. There are five registration tiers.

PRICING TIERS FOR ANNUAL MEETING

MICRO UTILITY	(<1 MGD or Collection Only) @ $300
SMALL UTILITY	(1-5 MGD) @ $500
MEDIUM UTILITY	(5-20 MGD) @ $900
LARGE UTILITY or REGULATORY AGENCY	(20-50 MGD) @ $2,000
MEGA UTILITY	(>50 MGD) @ $3,000

Send As Many People from your Utility or Agency for One Flat Fee

Questions? Contact Amy Haque at *ahaque@cswea.org*

ATTENDEE REGISTRATION FORM

96th ANNUAL MEETING

FULL CONFERENCE REGISTRATION

Includes Monday Night Social, Exhibits, Technical Sessions, Tuesday Exhibitors Box Lunch, Wednesday Exhibitors Reception and Annual Awards Event.
Full Conference Registration also includes all meals on Wednesday, State Section Business Meeting, and Annual Association Meeting.

	Before April 15	After April 15	Amount
Member	$515	$575	
Non-Member	$535	$585	
Retiree	$315	$345	
Student	$175	$175	
Banquet Selection (2)	A|B|C|D		

BASIC CONFERENCE REGISTRATION

Includes Monday Night Social, Exhibits, Technical Sessions, Exhibitors Box Lunch, and Tuesday Exhibitors Reception. Sit-down meals on Tuesday and Wednesday must be purchased separately.

	Before April 15	After April 15	Amount
Member	$380	$405	
Non-Member	$410	$435	
Retiree	$190	$210	
Student	$50	$50	

ONE DAY REGISTRATION

Tuesday: Includes Monday Night Social, Exhibits, Technical Sessions, Exhibitors Box Lunch, and Exhibitors Reception. Sit-down meals must be purchased separately.
Wednesday: Includes Exhibits and Technical Sessions. Sit-down meals must be purchased separately.

	Before April 15	After April 15	Amount
Tues-Member	$230	$255	
Tues-Non-Member (1)	$260	$295	
Wed - Member	$230	$255	
Wed - Non-Member (1)	$260	$285	

EVENTS AND MEALS (A LA CARTE)

Please circle event and meal selections for you and any guest/spouse who may be joining you for an event or meal.

	EVENTS						EVENTS W/MEALS					
ATTENDEE OR GUEST NAME	TOP GOLF	STORMWATER TOUR	5K RUN/WALK	SERVICE PROJECT	SOCIAL / MEET & GREET (GUESTS OF ATTENDEE ONLY)	PLANT TOUR	STATE SECTION BUSINESS MEETING	LUNCHEON	ANNUAL AWARDS EVENT	ALL MEALS	BANQUET CHOICE (2)	TOTAL
	$95	$35	$25	N/C	$25	N/C	$25	$35	$75	$135	A/B/C/D	
	$95	$35	$25	N/C	$25	N/C	$25	$35	$75	$135	A/B/C/D	
	$95	$35	$25	N/C	$25	N/C	$25	$35	$75	$135	A/B/C/D	
	$95	$35	$25	N/C	$25	N/C	$25	$35	$75	$135	A/B/C/D	
	$95	$35	$25	N/C	$25	N/C	$25	$35	$75	$135	A/B/C/D	

A= Chicken Picatta B= House Smoked Sirloin C= Salmon Provencal D= Saffron Balsamic Grilled Vegetables.

Global Water Stewardship Donation $ _____

GRAND TOTAL $ _____

Name _____ Employer _____
Address _____ City _____ State _____ ZIP _____
Phone _____ Email _____
WEF Member Number _____ New Member (within last year) ☐ Yes ☐ No
Operation Number (if applicable) _____
Are you a Young Professional (less than 36 years old) ☐ Yes ☐ No Do you become more active in CSWEA? ☐ Yes
Dietary Restrictions / Special Accomodations _____
Golf Partners _____
Would you like to donate an item to the CSWEA Global Water Stewardship Silent Auction ☐ Yes

Make Checks Payable to CENTRAL STATES WATER ENVIRONMENT ASSOCIATION | 1021 Alexandra Blvd, Crystal Lake, IL 60014

Questions? **Registration:** Amy Haque - 855-692-7932 x102 | *ahaque@cswea.org*

UTILITY & REGULATOR REGISTRATION FORM

Contact Person ____________________ Utility ____________________

Address ____________________ City __________ State __________ ZIP __________

Phone ____________________ Email ____________________

UTILITY AND REGULATOR REGISTRATION (1)

Registration includes Monday Night Social, Exhibits, Technical Sessions, Box Lunch, and Exhibitors' Reception. (Registration does not include the State Section Business Meeting, Annual Association Meeting, Annual Awards Event, or other Events. Register for them below).

	Before April 15	After April 15	Amount
Collection System Only or 0-1 MGD	$300	$350	
1-5 MGD	$500	$600	
5-20 MGD	$900	$1,000	
20-50 MGD or Regulatory Agency	$2,000	$2,500	
> 50 MGD	$3,000	$3,500	

UTILITY ATTENDEE REGISTRATION INFO & A LA CARTE SELECTIONS

Please mark the days of attendance, circle events and meals for each utility attendee and indicate the total for each attendee to the right.

	ATTENDING			EVENTS						EVENTS W/MEALS (2)					
ATTENDEE OR GUEST NAME	TUES	WED	BOTH	TOP GOLF	STORMWATER TOUR	SERVICE PROJECT	5K RUN/WALK	SOCIAL / MEET & GREET (GUESTS OF ATTENDEE ONLY)	PLANT TOUR	STATE SECTION BUSINESS MEETING	ANNUAL ASSOCIATION MEETING	ANNUAL AWARDS EVENT	ALL MEALS	BANQUET CHOICE (3)	TOTAL
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	
				$95	$30	N/C	$25	$25	N/C	$15	$20	$30	$65	A/B/C/D	

(1) Registration based on NPDES permitted flow. (2) Rates reflect maximum rates allowable on per diem or GSA rates. Only available to members registered as utilities. (3) A= Chicken Picatta B= House Smoked Sirloin C= Salmon Provencal D= Saffron Balsamic Grilled Vegetables.

Global Water Stewardship Donation $ ________

GRAND TOTAL $ ________

GUESTS & SPOUSE REGISTRATIONS

Please use the Attendee Form on previous page to purchase all Guest/Spouse event and meal tickets.

List any new WEF / CSWEA Members from the last year: ____________________

List all Young Professionals (35 years old or younger): ____________________

List attendees that would like to be more active in CSWEA: ____________________

Dietary Restrictions / Special Accomodations: ____________________

Please list name with request ____________________

Golf Partners: ____________________

Would you like to donate an item to the CSWEA Global Water Stewardship Silent Auction Yes ☐

Make Checks Payable to CENTRAL STATES WATER ENVIRONMENT ASSOCIATION I I 021 Alexandra Blvd, Crystal Lake, IL 60014

Questions? **Registration:** Amy Haque - 855-692-7932 x102 | *ahaque@cswea.org*

Register online at *www.cswea.org/events*

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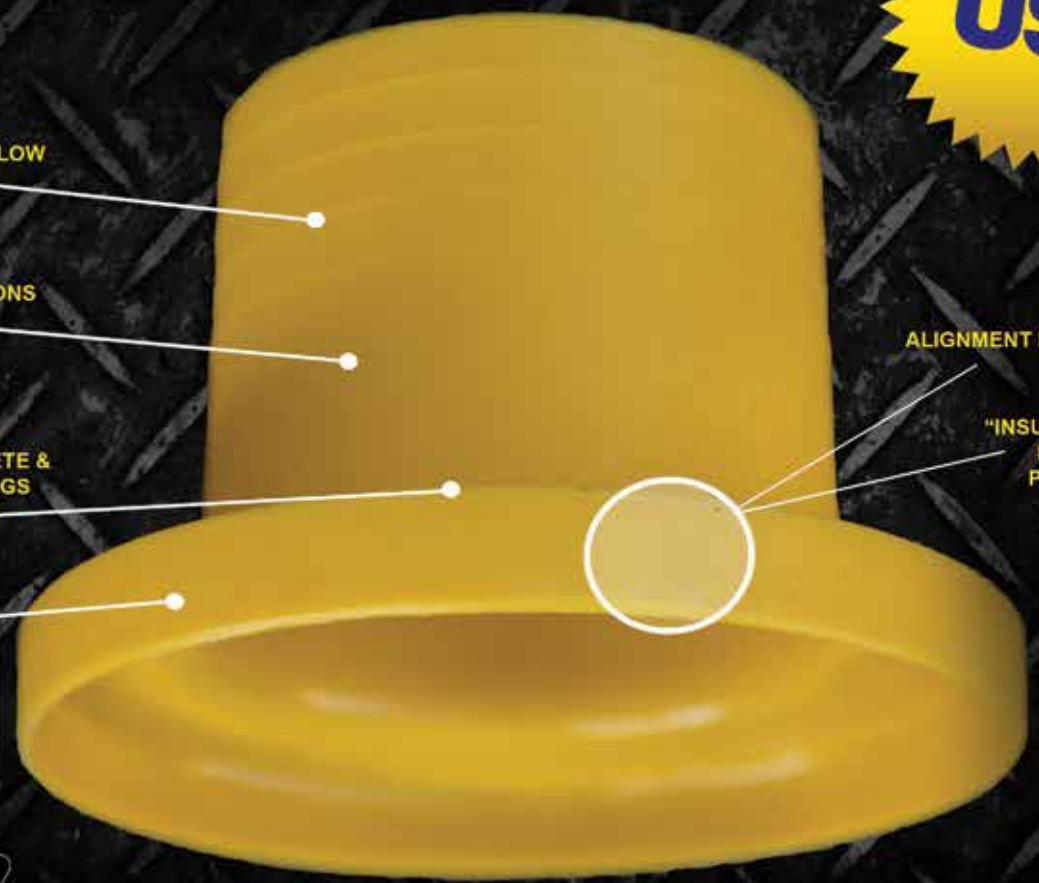

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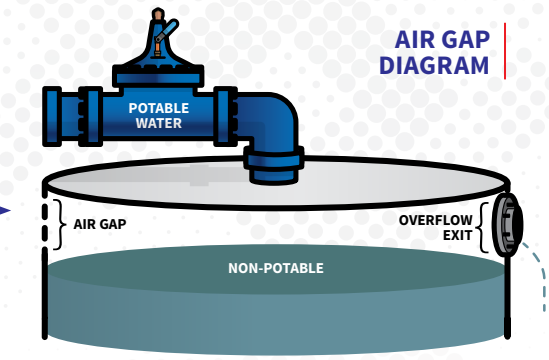

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Metropolitan Industries, Inc.

28TH ANNUAL CSWEA EDUCATION SEMINAR

Making Solid Decisions in an Uncertain Future

- Wastewater Solids Management -

APRIL 11TH 2023

Mark your calendars for the CSWEA 28th Annual Education Seminar to be held in person on April 11th, 2023 at the Monona Terrace in Madison, WI. We have an exciting program to discuss the ever-evolving world of biosolids and residuals management. This program will focus on uncertainties related to PFAS in biosolids/residuals, understanding of PFAS destruction in certain treatment processes, and how different utilities are managing their programs now and into the future.

Meet and Greet Reception – April 10th

All seminar attendees are invited to a reception (cash bar) on Monday April 10th from 5:30-7:00 pm at the Monona Terrace Convention Center. The seminar speakers will be available for networking and conversation.

28TH ANNUAL CSWEA EDUCATION SEMINAR SPEAKERS


GREG KESTER, P.E.


TESS RICHMAN


DR. CARL ROSEN


FREDRIC P. ANDES


DR. PATRICK MCNAMARA, P.E.


LLOYD WINCHELL, P.E.


JOSH LUTZ


JOE COOK, P.E.


CHRIS LEFEBVRE


EMMA LARSON

8:00 - 8:10: WELCOME AND INTRODUCTIONS

8:10 - 8:55: BIOSOLIDS CHALLENGES AND OPPORTUNITIES: FOCUS ON CLIMATE CHANGE MITIGATION

SPEAKER: GREG KESTER, P.E.
DIRECTOR OF
RENEWABLE RESOURCE PROGRAMS,
CALIFORNIA ASSOCIATION
OF SANITATION AGENCIES

California has adopted multiple legislative initiatives to mitigate climate change impacts and the Wastewater Sector can help achieve all of them. Co-digestion and recycling biosolids to soil are key opportunities. PFAS and other challenges such as conflicts with *Clean Air Act* requirements must also be addressed. This talk will provide details on these opportunities and challenges and how they transfer beyond California.

DETAILED BIO:

Greg Kester has been the Director of Renewable Resource Programs with the California Association of Sanitation Agencies (CASA) since 2007. Greg serves as both the technical and programmatic contact for CASA members and conduit for emerging issues on the state and federal levels on all biosolids, renewable energy, climate change mitigation, and during the pandemic on wastewater-based epidemiology and related COVID-19 issues. He holds a BS in Civil and

Environmental Engineering from the University of Wisconsin – Madison and is a registered Professional Engineer in Wisconsin.

8:55 - 9:30: U.S. EPA BIOSOLIDS PROGRAM UPDATE
SPEAKER: TESS RICHMAN
BIOLOGIST, USEPA BIOSOLIDS PROGRAM

The US EPA Biosolids Program will provide an update on recent activities including the biosolids risk assessment framework, the status of the PFOA and PFOS risk assessment, stakeholder engagement and research updates. The Office of Water (OW) at the EPA has responsibility for evaluating microbial and chemical risks resulting from the use and disposal of biosolids, i.e., treated sewage sludge from wastewater treatment plants. OW has developed a human and ecological framework to assess the risks resulting from chemical contaminants in biosolids that are land applied to farm fields or disposed of via landfilling.

DETAILED BIO:
Tess Richman is a biologist working in EPA's Biosolids Program within the Office of Water. Her work focuses on regulatory and programmatic activities. Over the past four years Tess' work has included planning two EPA Biosolids National Meetings, publishing Biosolids Biennial Reports No.8 and No.9, developing guidance on lagoon clean outs, streamlining requirements for products derived from sewage sludge, and supporting risk assessment for chemicals found in biosolids.

9:30 - 9:50: POSTER SESSION & BREAK

9:50 - 10:25: AGRICULTURAL USAGE OF BIOSOLIDS AND RESIDUALS
SPEAKER: DR. CARL ROSEN
PROFESSOR AND EXTENSION SOIL SCIENTIST, DEPARTMENT OF SOIL, WATER, AND CLIMATE AT THE UNIVERSITY OF MINNESOTA

Use of biosolids as a beneficial soil amendment for crop production has been a common practice for many years. Regulations for biosolids use were established by the US Environmental Protection Agency in 1993 and have since been adopted by state regulatory agencies. This presentation will briefly address current criteria established for biosolids application including metal loading, pathogen reduction and nitrogen content. Assuming metal loading and pathogen reduction criteria are met, biosolids application is based on meeting the nitrogen requirements of the crop being grown. However, continuous use of biosolids on the same site based on nitrogen requirement can result in substantial increases in soil phosphorus.

DETAILED BIO:
Carl Rosen is a Professor and Extension Soil Scientist in the Department of Soil, Water, & Climate at the University of Minnesota and currently serves as Department Head. He received his MS degree in horticulture from Penn State University and a Ph.D. degree in Soil Science from UC Davis. His research and extension programs in Minnesota have focused on optimizing nutrient management for a variety of crops with particular emphasis on irrigated cropping systems. His efforts have also focused on water quality issues related to fertilizer use and use of municipal and industrial by-products as amendments for agricultural soils.

10:25 - 11:00 THE LEGAL SIDE OF PFAS REGULATION
SPEAKER: FREDRIC P. ANDES
PARTNER AT BARNES AND THORNBURG LAW OFFICES

USEPA and State agencies are moving quickly to develop regulatory requirements governing PFAS, including drinking water standards, surface water quality standards, groundwater quality standards, biosolids management requirements, product substitution and source control requirements, and even air emission standards. Many of these new regulations will impose major costs on municipalities, and may require significant changes to plant operations and pretreatment programs.

DETAILED BIO:
Fredric P. Andes is a partner in the Chicago and Washington, D.C. offices of Barnes & Thornburg LLP. He is the leader of the firm's Water Team. He advises trade associations, municipalities, and industries on TMDLs, water quality standards, discharge permits, and other water quality regulatory, compliance and enforcement matters on the state and federal levels. He is the coordinator of the Federal Water Quality Coalition, which is a broad-based group of regulated parties that participates in EPA rulemakings concerning *Clean Water Act* programs. Also, he helps manage the activities of the PFAS Regulatory Coalition. Mr. Andes graduated cum laude from Harvard Law School in 1980, and obtained his undergraduate degree from Northwestern University in 1977.

11:00 - 11:30: MORNING PANEL Q&A

11:30 - 12:40: LUNCH WITH POSTER SESSION

12:40 - 1:15: PYROLYSIS FOR BIOSOLIDS MANAGEMENT: BENEFITS, CHALLENGES, AND IMPACTS ON PFAS
SPEAKER: DR. PATRICK MCNAMARA, P.E.
ASSOCIATE PROFESSOR, MARQUETTE UNIVERSITY AND WASTEWATER PROCESS ENGINEER, BLACK & VEATCH

Per- and Polyfluoroalkyl Substances (PFAS) have been an increasing focus of the public, legislative bodies, and the regulatory community. Indeed, WI DNR has a biosolids PFAS strategy to limit land application based on certain PFAS levels. Nationally, interest in thermal treatment technologies has increased as a means to potentially remove PFAS while generating beneficial end products. Pyrolysis is a thermal process that occurs in the absence of oxygen and generates a beneficial solid product (biochar), py-gas that can be used for energy recovery, and py-liquid that is difficult to handle. This presentation will highlight benefits of pyrolysis along with current challenges. The impact of pyrolysis on the fate of PFAS based on our recent research will be discussed.

DETAILED BIO:
Dr. Patrick McNamara has been an environmental engineering professor at Marquette for over ten years. There, he leads a research group that primarily focuses on emerging contaminants. He also conducts research on residuals and biosolids processes including pyrolysis, anaerobic digestion, and dewaterability. He spent his sabbatical with Black & Veatch in 2021 and has stayed on as a wastewater process engineer. He is the PI on an unsolicited WRF project called "Understanding the Value Proposition for Thermal Processes to Mitigate PFAS in Biosolids."

1:15 - 1:50 PFAS FATE DURING INCINERATION
SPEAKER: LLOYD WINCHELL, P.E.
ASSOCIATE ENGINEER, BROWN AND CALDWELL

Wastewater facilities regularly receive per- and polyfluoroalkyl substances (PFAS) contaminated influent flow. Certain PFAS partition to the solids generated during treatment. Only incineration offers the potential to destroy PFAS of all the commonly applied solids treatment technologies. Only sparse information can be found on the fate of PFAS through incineration process, and even less when considering sewage sludge incinerators (SSI).

DETAILED BIO:
Since graduating in 2005 from the University of Minnesota, Lloyd has spent seventeen years with Brown and Caldwell as an environmental engineer. Lloyd's work has focused solely on wastewater treatment projects involving both industrial and municipal utilities. His specialties include wastewater liquids and solids process engineering. Recent solids process engineering includes PFAS fate, incineration optimization, energy recovery in solids processing, and emissions compliance.

1:50 - 2:05: EARLY AFTERNOON Q&A

2:05 - 2:20: AFTERNOON BREAK

2:20 - 2:55 PM: STATE OF THE SOLIDS STREAM: AN UPDATE ON THE CITY OF COLUMBUS BIOSOLIDS PROGRAM

SPEAKERS: **JOSH LUTZ**
RESIDUAL MANAGER,
CITY OF COLUMBUS PUBLIC UTILITIES
JOE COOK, P.E.
ENGINEER, CITY OF COLUMBUS
PUBLIC UTILITIES

The City of Columbus has committed to 100% beneficial reuse of its wastewater residuals stream. The City has achieved this goal through the use of a diverse and region-specific biosolids management program. This presentation provides an overview of the core components of the biosolids management program and relative utilization of each component, challenges faced by the City due to growth and regulation, and future plans to expand and capitalize on beneficial use of our biosolids stream. Attendees can expect to learn about Class B biosolids land application, deep row hybrid poplar tree farms, municipal biosolids composting to Class A Exceptional Quality biosolids, digestion's impact on biosolids quality, and biogas cogeneration.

DETAILED BIO:

Josh Lutz is a graduate of The Ohio State University in Agricultural Engineering and holds a Class 3 Wastewater Operations license and a Professional USCC Composting license. Josh has more than15 years of experience working in wastewater treatment and biosolids handling. Josh has been in his current position for six years at the City of Columbus Public Utilities. During his first year, he was able to help lead the City of Columbus to a status of 100% beneficial reuse of their biosolids and is on track to maintain this status for the 6th year in a row.

Joe Cook is a professional engineer licensed in Ohio. He graduated from Ohio University in 2014 and is a first year director on the Ohio Water and Environment Association's Southeast Section Executive Committee. Joe is involved in the WEF RISE Hydrothermal Liquefaction focus group and is focused on Treatment Engineering at the City of Columbus managing Capital and Program Contracts for the City Wastewater Treatment Facilities.

2:55 - 3:15: BIOSOLIDS DRYING AND THE FUTURE OF BIOSOLIDS MANAGEMENT

SPEAKER: CHRIS LEFEBVRE
WASTEWATER SUPERINTENDENT,
CITY OF STEVENS POINT, WI

The future of biosolids management is uncertain. Concerns over land availability and emerging pollutants has forced many municipalities across the Midwest to explore new technologies to continue responsible biosolids management. Many of these municipalities are looking to improve their biosolids management by reaching an EPA approved Class A biosolid. Some facilities have considered becoming a regional biosolids handling facility to help offset the high cost of these new technologies while assisting their neighboring communities with their biosolids management.

DETAILED BIO:

Chris Lefebvre graduated from the University of Wisconsin Stevens Point with a Bachelor of Science Degree in Soil and Waste Resource Management. He is a Wisconsin Certified Wastewater Operator as well as a Certified Water Operator. He has been employed by the City of Stevens Point since 2008, first as a Wastewater Operator, then as Chief Wastewater Operator, and is currently the Wastewater Superintendent for the city. Chris has served as the PWO Representative for Central States and is currently the Vice-Chair for the Wisconsin Section of CSWEA.

3:15 - 3:35: INNOVATION & BIOSOLIDS AT ST. CLOUD MINNESOTA

SPEAKER: EMMA LARSON
ASSISTANT PUBLIC UTILITIES DIRECTOR,
CITY OF ST. CLOUD, MN

The City of St. Cloud's Wastewater Treatment Facility has transformed to the Nutrients, Energy & Water Recovery Facility in the last few years. Resource recovery and energy efficiency master planning started in 2014; since then, the City has become a national and global leader in innovation in the water and resource recovery industry. In 2018, the City commissioned new technologies to enhance the facility's ability to recover nutrients. This project was called the Nutrient Recovery & Reuse Project and consisted of the installation of innovative technologies that reduces biosolids volume, thermal hydrolyzes (Lystek) the product to generate a biofertilizer and struvite harvesting (Ostara).

DETAILED BIO:

Emma has worked for the City of St. Cloud for 14 years and is now the Assistant Public Utilities Director, and oversees the wastewater and stormwater Divisions within the City. Emma has worked as part of the utilities team for the Energy Efficiency and Biogas project, the Nutrient Recovery and Reuse Project and is now helping lead the team working on the implementation of fuels of the future. The City has been awarded the "Utility of the Future" five times in the last six years for their work related to sustainability, resource recovery, and community engagement.

3:35 - 4:00: PANEL SESSION Q&A

REGISTRATION CHARGES

1 **Registration fee to attend live event (includes continental breakfast, lunch, and refreshments)**

Fee per Person	by March 15	after March 15
Education Seminar (ES)	$200	$225
Additional Utility Attendee*	$50	$55
Student**	$25	$30

*After one person from a utility registers at standard price, up to five additional people can register for $50 per person.
**Students – please indicate if you will present a poster and name of poster:

___ Yes Tentative title of poster: _____

Please indicate dietary restrictions: _____ vegetarian _____ vegan _____ gluten free _____ other

2 **No refunds given after March 23**

Lodging: A limited number of rooms are available at The Hilton Madison Monona Terrace, 9 East Wilson St, Madison. The rooms have been reserved at a conference rate of $169 per night and will be held until March 11. For reservations, please call the hotel at 608-255-5100 and reference group code "CSWEA". Parking is available for a fee at the Hilton or next door at the Monona Terrace Community and Convention Center. Other lodging is available nearby at the Best Western Premier Park Hotel (608-285-8000) at $149 to $169 per night. Reference CSWEA for the group block. This hotel is about 0.7 miles walking distance from the Monona Terrace Community and Convention Center. Alternatively, rooms for each hotel can be booked online at the conference rates using the unique booking links below:

Hilton:
https://www.hilton.com/en/book/reservation/deeplink/?ctyhocn=MSNMHHF&groupCode=CSWEA&arrivaldate=2023-04-10&departuredate=2023-04-11&cid=OM,WW,HILTONLINK,EN,DirectLink&fromId=HILTONLINKDIRECT

Best Western:
https://www.bestwestern.com/en_US/book/hotel-rooms.50061.html?groupId=3P7NG0T1

Attendees are invited to sign up for dinner at Cooper's Tavern hosted by the CSWEA Innovation & Technology Committee following the meet and greet concludes. Registration information is included online.

I&T Dinner @ $35 Each | Cooper's Tavern Monday, April 10 from 7 – 9 pm (Following Meet and Greet Social)
7:00 Cocktails - Cash Bar
7:30 Appetizers & Presentation
8:00 Dinner

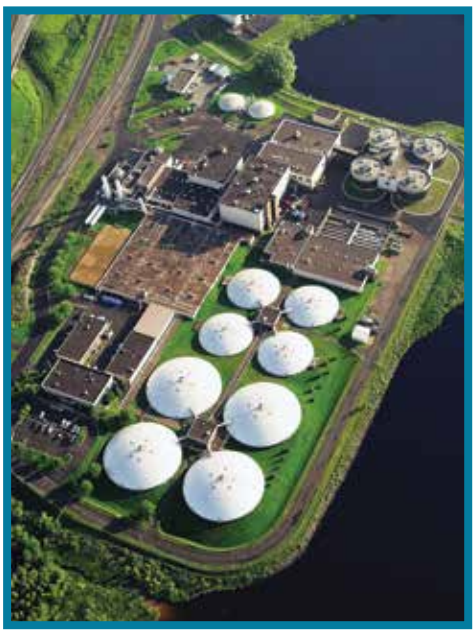
Price includes dinner only (no drinks). Dinner registration closes end of day Friday, April 7th, 2023

PLANT PROFILE:

WESTERN LAKE SUPERIOR SANITARY DISTRICT

By Ryan Ihrke, Environmental Program Coordinator

The Western Lake Superior Sanitary District (WLSSD) is a special-purpose unit of government created by the Minnesota State Legislature in 1971 to address the serious pollution problems in the lower St. Louis River. Originally designated as a wastewater authority, WLSSD was also granted solid waste authority in 1974 for the 530-square-mile region in northeast Minnesota. The District's dual wastewater and solid waste authority offers an enhanced ability to deliver on its mission to protect public health, preserve, ensure the best use of natural resources, and prevent pollution.



The St. Louis River is the largest US tributary to Lake Superior, draining 3,643 miles of watershed in northeast Minnesota and northwest Wisconsin. In 1987, the St. Louis River was designated as one of 43 international Areas of Concern (AOC) on the Great Lakes due to significant environmental degradation that occurred at those locations before environmental regulations were adopted. The St. Louis River Area of Concern is one of 31 AOCs within the US and is the second largest US-based AOC.

The WLSSD wastewater treatment plant began operating in 1978, consolidating 17 old, inadequately treated wastewater discharges into one regional treatment facility. Located on a 26-acre site on the banks of the St. Louis River Estuary in Duluth, Minnesota, the wastewater treatment plant currently treats 36 million gallons per day (MGD) with a design capacity of 48 MGD. Serving 17 municipalities and four major industries, the treatment plant treats 13.9 billion gallons annually.

COLLECTION SYSTEM

WLSSD owns and operates 17 pump stations and approximately 76 miles of sewer interceptors including 43 miles of gravity interceptors and 33 miles of force mains. The dry-weather volumes handled by the pumping stations range from 0.50 to 24 MGD. The District also owns and operates four wastewater storage basins ranging from 200,000 gallons to 1,000,000 gallons in capacity.

Municipal customers within the WLSSD service area own, operate, and maintain their collection systems before entry into the WLSSD collection system. The City of Duluth alone has over 400 miles of local sanitary sewers. Of the 140,000 residents in the District, approximately 82% of the population is connected to municipal sanitary sewer services. WLSSD also accepts hauled liquid waste from throughout northeast Minnesota including household septic tank waste.

WASTEWATER TREATMENT PLANT

The wastewater treatment process consists of preliminary screening and grit removal, secondary treatment with a high-purity oxygen-activated sludge process, secondary clarification, seasonal disinfection with chlorination and dechlorination, and tertiary mixed media filtration.

One unique characteristic of the WLSSD facility is the dominance of loading from industries relative to municipal sources. On average, 50%-60% of current wastewater influent is from two large pulp and paper mills. Characteristics of this waste include high heat, increased odor potential, and corrosive properties. Due to high tannins, ultraviolet disinfection is not feasible. The industrial and municipal customers within the WLSSD service area create wastewater that is highly variable in flow, temperature, and composition, thereby requiring careful monitoring, communication, and cooperation with industrial customers.

ENERGY EFFICIENCY

As treatment plant updates are required, WLSSD staff identify opportunities to increase energy efficiency while improving performance. When the original 1970s cryogenic oxygen generation equipment required replacement in 2019, WLSSD staff chose to replace the equipment with two vacuum swing adsorption (VSA) units to serve as the primary source of high-purity oxygen (90%+) gas. Each of these units can produce 40 tons of pure oxygen for a total of 80 tons of pure oxygen daily. Unlike the previous cryogenic equipment, if the demand for oxygen drops, the VSA system can be adjusted to meet the lower need either by operating a single VSA unit or by adding idle time within each cycle.

WLSSD's two vacuum swing adsorption units serve as the primary source of high-purity oxygen (90%+) gas.

WLSSD has made strides in efficiencies in the secondary treatment process by adding variable frequency drives to mixers, improving dissolved oxygen monitoring, and optimization of oxygen feed and dissolution control strategies. Beyond oxygen production, plant upgrades to solids dewatering, screw pumps, HVAC, and lighting helped WLSSD decrease its electricity consumption from 36 million kW/year in 2013 to 30 million kW/year in 2022 while maintaining effective wastewater treatment. The reduction in electricity consumption helped WLSSD navigate a 58% increase in their average billed kWh cost during the same timeframe.

ENERGY GENERATION

In addition to saving energy, WLSSD has also focused on generating energy since the plant opened in 1978. WLSSD's solid waste authority combined with the oil embargo in the late 1970s led to the decision to burn municipal solid waste as an energy source during the plant's first years. Wastewater solids were added to the incineration process starting in 1982 and continued through 1999.

In 2001, WLSSD began using four 1-million-gallon anaerobic digesters tanks for temperature-phased anaerobic digestion of wastewater solids. Methane-rich biogas produced in these digesters is collected, conditioned, and piped to a series of Hurst boilers to heat the plant and provide the necessary heat for the treatment process.

Currently, if excess biogas is generated beyond the needs of the treatment process and plant heating, the biogas is burned off with a flare. Three 850 kW engine generators will be installed in 2023 to provide the capacity to produce 35% of the electricity needed to run the plant. Recovered heat from the generators will be reused in the treatment process.

WASTEWATER SOLIDS

WLSSD's Field Green® fertilizer, which is produced through anaerobic digestion, is land applied as a Class B biosolids material to area farms and minelands. In the early 2000s, the Minnesota Department of Natural Resources and WLSSD conducted research to develop specific application rates for grass and legumes on mineland taconite basin reclamation sites. Mineland application substantially reduces the amount of taconite dust that leaves these sites. WLSSD staff proactively educate about the use of biosolids fertilizer at the local county fair, at agricultural field days, and through a semiannual newsletter for program participants. During the 2022 crop year (September 2021-August 2022) WLSSD's land application staff applied more than 23,000 tons of biosolids on 83 farm and mineland sites totaling over 1,400 acres.

During the 2022 crop year, WLSSD's land application staff applied more than 23,000 tons of biosolids on 83 farm and mineland sites totaling over 1,400 acres.

WLSSD's Clarifiers, which sit beside the St. Louis River.

MERCURY

The historical pollution of the St. Louis River, and its proximity to Lake Superior, amplifies the importance of WLSSD's wastewater treatment efforts. To address concerns related to the mercury present in the St. Louis River, WLSSD's National Pollutant Discharge Elimination System (NPDES) Permit was modified in 1995 to a stricter mercury limit to align with the Environmental Protection Agency's Water Quality Guidance for the Great Lakes Watershed, commonly known as the Great Lakes Initiative (GLI).

In addition to research and refinement of mercury removal technologies, WLSSD's robust industrial pretreatment program, residential education programs, and household hazardous waste collection facility work to limit additional mercury pollution throughout the District. The efforts pioneered by WLSSD in the late 1990s significantly reduced mercury concentrations and were published in *The Blueprint for Mercury Elimination* guidebook.

While progress has been made, consistent compliance with NPDES mercury discharge limits of 1.8 ng/L as a monthly average and 3.2 ng/L as a daily maximum concentration have not been attained without a variance from the water quality standard applicable to the facility. A variance provides additional time to explore options for additional mercury reduction, includes interim effluent limits, and requires both a pollutant minimization program and annual progress reports on actions taken and reductions made.

In 2019-2020, WLSSD conducted studies on secondary effluent with the CLEARAS Advanced Biological Nutrient Recovery

The mercury trial conducted in 2019 aimed to use a CLEARAS ABNR system to remove mercury waste from wastewater.

(ABNR™) system. ABNR uses algae to remove phosphorous and nitrogen in wastewater. WLSSD performed small-scale pilot studies to see if ABNR could also remove mercury. While enough mercury was removed to reach the 1.8 ng/L monthly average for total mercury, a feasibility study determined onsite development of this system at the necessary scale was not practical due to the economic impact on customers. Additionally, the amount of mercury removed from wastewater was equivalent to the amount that would subsequently be released into the environment in other media. WLSSD is now studying Hydrotech™ disc filters to capture additional mercury associated with solids removal.

During 2022, WLSSD successfully met mercury discharge limits of 1.8 ng/L as a monthly average and 3.2 ng/L as a daily maximum concentration in seven out of 12 months, and achieved variance limits every month. WLSSD has applied for permit renewal, including a request for a variance while working to consistently achieve applicable NPDES concentration limits.

ORGANIZATION AND MISSION

WLSSD's identity as both a wastewater and solid waste authority and a staff size of 100+ employees require internal education highlighting how various roles must intersect to advance organizational goals. This past year, internal focus groups, project fact sheets, and employee facility tours increased employee understanding of the District's new and ongoing efforts. As veteran employees retire and new employees join the organization, these initiatives also help build relationships despite limited in-person gatherings due to the pandemic.

Despite changes in demographics, industries, and climate conditions impacting the wastewater received by WLSSD, the treatment plant continues to emphasize operational excellence while advancing the District's mission of protecting the St. Louis River basin and Lake Superior. CS

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MIDWEST STUDENT DESIGN WINNER
Global Water Stewardship International Category:

INSTITUTO TECNOLOGICO DE COSTA RICA

In November 2022, seven environmental engineering students from the Instituto Tecnológico de Costa Rica (TEC) won an internal competition at TEC for the design of a wastewater treatment plant (WTP) for the community of Montezuma, Costa Rica. This allowed them to participate in an international competition in the US known as Midwest Student Design Competition (MSDC), organized by Global Water Stewardship (GWS). The team is formed by Sol Carpio Delgado, Denisse Saborío Palma, Adriana Rojas Chacón, Maricel Chaves Chaves, Fabiola Pérez Ramírez, Melany Trujillo Córdoba and Valeria Castillo Monestel. The advisors of this project were Mary Luz Barrios, PhD; Diana Zambrano, MSc; and Jorge Calvo, PhD. At the Midwest Student Design Competition, the design stood out among several universities and managed to win the International Category. This allowed the TEC team to move forward and compete in the largest conference and competition in the world related to water quality, WEFTEC, held in October 2022 in New Orleans, LA.

MIDWEST DESIGN COMPETITION

TEC | Tecnológico de Costa Rica

The TEC Team (L-R): Sol Carpio, Denisse Saborío, Adriana Rojas, Maricel Chaves, Fabiola Pérez, Melany Trujillo, and Valeria Castillo.

Integral Wastewater Treatment Design for MONTEZUMA, CÓBANO, COSTA RICA

By Sol Carpio Delgado, Valeria Castillo Monestel, Maricel Chaves Chaves, Fabiola Pérez Ramírez, Adriana Rojas Chacón, Denisse Saborío Palma, and Melany Trujillo Córdoba

CONCERN

The proposed design of the wastewater treatment plant (WTP) is focused on the rural coastal community of Montezuma, Costa Rica located in Cóbano, Puntarenas. It is known for its large touristic activity, the conservation of flora and fauna, as well as the nesting of turtle eggs. Tourism is the main economic income in the region. Currently, most homes and businesses are connected to a private septic tank, and in some cases, homes discharge sewage directly into rivers that eventually reach the ocean. Recent studies suggest that there is evidence of septic tank malfunction due to the neglect of routine maintenance, leading to contamination caused by the effluent that does not infiltrate into the ground but is rather carried away by runoff. Due to its proximity to the sea, the situation of poor wastewater management has caused concern for its inhabitants, the tourism sector, the Municipality of Nicoya, AyA, and the local Managing Associations of Communal Aqueduct and Sewer Systems (ASADA). This problem represents a possible source of contamination and health hazard, not only to people but also to wildlife. For this reason, the sectors mentioned above promote the creation of a centralized wastewater treatment and collection system which the community is open to implementing. The resident population of Montezuma is 1015 habitants and 588 tourists per month, for the design period of 24 years the growth rate for the resident population is expected to be 1.3% and for the floating population of 2.0%.

OBJECTIVE

The goal of this project was to design and evaluate different proposals to find an appropriate integral wastewater treatment and sanitary sewer for the Montezuma community.

SELECTION OF THE SITE

Before the selection of the site, some important points of view were considered.

Firstly, the general information of Montezuma as a community was taken into account. The main social activity is tourism; the harmony that Montezuma offers makes this place a pretty and attractive option for national and international visitors. Montezuma was chosen for this project because of the way the people handle their wastewaters. The incorrect management of old septic tanks, and the location of the community makes the collection and cleaning of these tanks very hard and unusual, which generates a bigger sanitary problem.

Secondly, it was very important to take into consideration the terrain,

Figure 1: Delimitation community zone and the possible sites for the wastewater treatment plant.

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population, and geography of the community. In this case, the presence of oceanic rocks in Montezuma above the levels of groundwater makes it difficult to dig more than two meters since this kind of rocks would be encountered on average from 1-2 m below ground elevation. Furthermore, to make an effective recollection of the wastewater, the population and their allocation need to be taken into consideration. The geography of the place was very important to consider; with the adequate distribution and localization of the plant, the pumping cost can be lowered using, where possible, the slope of the terrain. All the topics mentioned above are related to the country's regulations, which is highly important for the project since the proposal was designed for Montezuma, a coastal area. The Wastewater Discharge and Reuse Regulation (N° 33601), which is the main regulation used for this project, establishes that if the measured parameters are below the permissible limits, the treated water can be reused for irrigation purposes.

In the meeting with the ASADA's representative, three different sites for the WTP were suggested and considering all the advantages and disadvantages of each site, the best option was chosen. The first location was very small, located right in Montezuma's downtown. Taking into consideration the size, location, and closeness to the beach and the commerce center, which could cause possible odor and sound issues, this option was discarded. The second place consisted of a private terrain, further away from the center but next to the public school and in front of the beach. Another important aspect to consider about this second site was that the town hall still needed to negotiate the usage of the terrain, so this terrain was also discarded because of those inconveniences. It's important to remark that the regulations for the use and discharge of wastewater in Costa Rica stipulate the restrictions for the type of water that the project is going to treat. The third site and the chosen one was next to the public cemetery, it is widespread and far from the center, with a lot of trees. This site needs some previous work to be prepared to construct on it, but it is considered the best option for a treatment plant building.

The first two discarded options can instead be used as pump stations; these are necessary to pump the recollected water all the way to the treatment plant site, since it is on a slightly higher ground than the city center.

EVALUATION OF DESIGN FLOWRATES

As Montezuma is a highly touristic area, the non-permanent population data in the place fluctuates.

Based on the information provided by the ASADA and the GWS problem statement, this project worked with a total of 1015 permanent residents, with a consumption of 34.3 gal/inhab*day. From this, the floating population was calculated, resulting in approximately 624 people a day in 2021. Next, projections were made for 24 years, which corresponds to the design period, where the results showed a resident population of 1,332 people and 923 tourists/day, taking a growth of 2% per year.

The two scenarios that were studied to carry out the design correspond to: the average flow pertaining to the population projection of 2045 (0.88 gal/s), as well as the maximum flow (1.43 gal/s). This second flowrate was the one used for the design process since it is necessary for the treatment plant to be capable of handling the largest amount of wastewater that it can potentially receive.

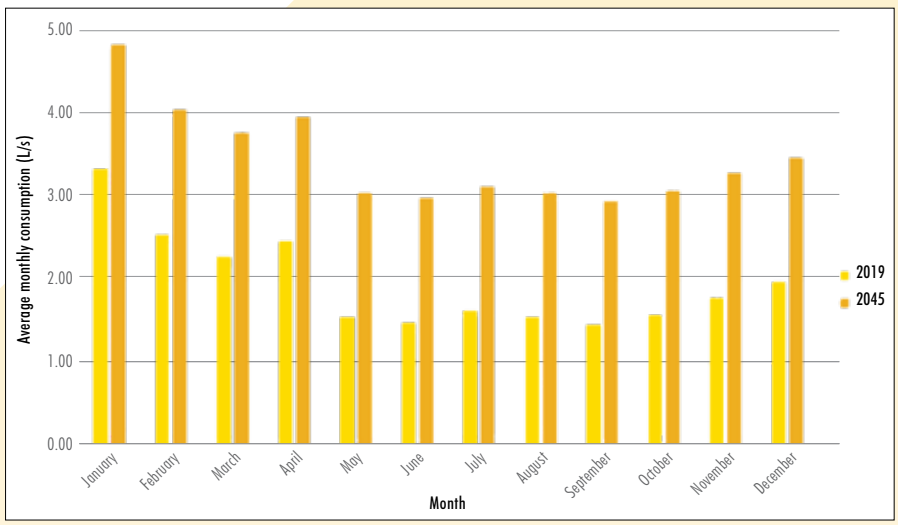

Figure 2: Community water demand 2019 and projection to 2043.

PROCESS SELECTION

A multicriteria analysis was followed for the correct selection of the treatment train. First, a meeting was held with the representative member of the ASADA, where a series of questions defined the weight of various aspects for multicriteria analysis. The environmental, social, economic, and technical aspects were evaluated, which resulted in a greater weight for the social and economic part with 38% and 34%, followed by the technical and environmental part with 15% and 13% respectively.

According to this information, for the primary and secondary treatment of the wastewater, five different proposal designs were considered. Option A had two units of Upflow Anaerobic Sludge Blankets (UASB) with constructed wetlands. Option B was designed with two units of a primary settler, Upflow Anaerobic Filter (FAFA), and constructed wetland. However, both these options were ruled out because constructed wetlands required a large amount of land beyond the site boundaries. Option C consisted of two units of primary settlers, low-rate trickling filters with rock packing, and secondary settlers. Option D was designed two units of UASB, low-rate trickling filters with rock packing, and secondary settlers. Finally, Option E was projected with two units of equalizer tanks and sequential batch reactors (SBR).

After evaluating the weights of the environmental, social, economic, and technical aspects, each of the five proposed technologies were evaluated, based on the different criteria as a series of subdivisions were made. In the environmental aspect, the generation of sludge, the interaction with the environment and the generation of odors were considered. Regarding the social aspect, the interference with other activities such as shops or hotels was taken into account, as well as the aesthetics of the proposed wastewater treatment plant. In the economic part, the initial costs were evaluated, as well as the operation and maintenance of this. Finally, regarding the technical criteria, the space required by the treatment system was considered, as well as the level of education required by the plant operators.

Each of the proposed options was evaluated against all these criteria by means of a scale and once the normalization and weighting of the data were carried out as a result that the best option to choose would be Option E, the sequencing batch reactor.

PROPOSED TREATMENT DESIGN

Every treatment system must have a series of components that integrate with each other to successfully fulfill their respective functions, for which the selected proposal will have a pretreatment with fine and coarse screening and a sand trap. The main purpose of the first operation will be to protect the treatment plant from bulky contaminants, whether floating or suspended, there will be two screening grids, the first grid is thick, with nine bars of 13 mm thickness, 20 mm spacing, and 45-degree pitch, followed by a fine grid with 15 bars of 10 mm thickness, 10 mm spacing and 45-degree pitch. The sand trap will have dimensions of 1 m x 1.5 m and a depth of 1.2 m, which will guarantee the extraction of raw water, sand, and fine mineral particles.

As stated before, in the multicriteria it was determined that Option E was the most appropriate treatment. In addition to the pretreatment, the implementation of a storage tank with the purpose of controlling highly fluctuating flows and loads is encouraged. Montezuma has a fluctuating population during the high season of tourism, therefore two units with measurements of 1.3 m x 2.3 m and a depth of 2 m would be required. After that a sequential batch reactor (SBR) is proposed, it consists of a treatment similar to a conventional activated sludge system, but it has the difference that all the stages are carried out by means one unique tank. These mentioned stages are four in total, the first is known as filling, followed by a reaction, then the sedimentation stage and finally emptying. Two units will be needed, each with a dimension of 4 m x 7 m and a depth of 6 m. This treatment is characterized by its easy operation and its high efficiency in terms

Criterion and Indicators	Weights	Unit	Option A	Option B	Option C	Option D	Option E
Environmental	13%						
Sludge Generation	6%	kg/month	1155,8	3285,0	4684,2	2737,5	4684,2
Interaction with the Environment	3%	Scale (1-3-5)	5	5	3	3	1
Odors	4%	Scale (1-3-5)	3	5	5	4	1
Social	38%						
Interference with other activities	10%	Scale (1-3-5)	1	2	3	3	1
Aesthetic	29%	Scale (1-3-5)	5	5	3	3	4
Economical	34%						
O&M	17%	Thousand US$	7,8	6,0	3,2	6,7	7,0
Initial Investment Cost	17%	Thousand US$	86,8	77,4	49,5	41,1	153,5
Technical	15%						
Space Required	4%	m^2	1660,7	1310,4	336,2	210,8	150,6
Technical Level of the Plant Operators	11%	Scale (1-3-5)	4	3	3	4	3

Table 1: Analysis Multi-criteria for the five treatments proposals.

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Figure 3: Lateral projection of the proposed treatment design.

of chemical oxygen demand (COD) and nutrients. Also, for the correct disinfection of the water, there will be a tank in the form of 1 m^3, with a dose of 1.8 g/m^3 of calcium hypochlorite, with which it is expected to reduce the amount of total fecal coliforms to less than 1000 MPN/100 mL. Finally, there will be drying beds, where the mud will be placed in shallow rectangular compartments. Two units with a dimension of 6 m x 6 m and a depth of 1 m would be required, as well as a drying time of 21 days and a purge frequency of nine days. This option for the sludge handling was chosen because among its main advantages one can mention the low level of investment, operational simplicity, limited energy consumption and the fact that it does not require the addition of chemical products.

Figure 4 shows the treatment plant at the construction site, with the respective construction boundary of 10 m corresponding to closed reactors according to Costa Rican regulations, and the location of the different treatment units on the ground. In addition, Table 2 presents the characteristics of the water that will enter the WWTP, as well as the removal of different parameters that will comply with the provisions of the Wastewater Discharge and Reuse Regulation No. 33601 for type 1 water: Reuse urban.

COLLECTION SYSTEM

Montezuma community does not have a collection system since the wastewater treatment is currently done through septic tanks, so the proposed sanitary sewer system was designed with consideration of an existing study with topographic zone surveys through the methodology of RTK and using the software AutoCAD for modeling the collection system on the site.

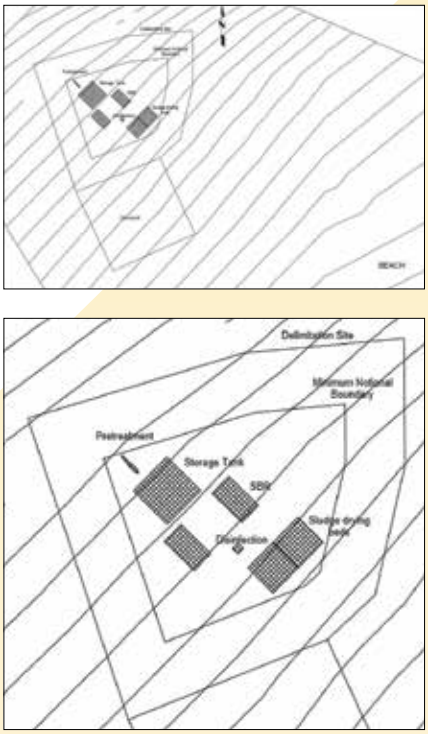

Figure 4: Plan view of the construction site location.

When analyzing the topographic characteristics, it was determined that the best option is a conventional gravity system. Nevertheless, three different points have a negative slope that can represent a problem for the passage of wastewater, for that reason we proposed to add pumping stations at each of these sections with pressure pumps of 1 HP.

For this design, PVC pipes with a width of 20 cm (8 in) will be used. They cannot be more than 2 m deep, since the project is going to be carried out in coastal areas where there are oceanic rocks that can affect excavations or

Parameters	% Removal	Tributary	Effluent	Units
BOD	92	280	22.4	mg/L
COD	86	550	77	mg/L
SST	80	220	44	mg/L
Total Nitrogen	52	50	24	mg/L
Total phosphorus	67	20	6.6	mg/L

Table 2: Removal efficiency anticipated by the design of the proposed WWTP.

the passage of pipes, for which the maximum depth of the design is 1.5 m.

As seen in Figure 5, the sewer design is subdivided into three different sites in the delimitation zone. Site 3 is the last section where the wastewater is collected, this part of the community is in a greater percentage of the commercial and hotel zone, producing a greater flow of residual water. The collection takes place in the last pumping zone, where it is redirected to the selected site for the wastewater treatment plant.

COST ANALYSIS

An analysis was conducted to estimate the costs related to both the sanitary sewer system as well as the wastewater treatment plant for a 24-year design period.

On one hand, the capital costs were analyzed. These included the initial cost for the different stages of treatment in the plant (preliminary treatment, equalization tank, SBR system including diffusers, valves, mixers, sludge pumps, decanters, and a control panel; disinfection tank and sludge drying beds) as well as the estimated costs for the sanitary sewer system. GWS provided a spreadsheet with various unit costs of materials and services. The sanitary sewer costs were estimated from available literature of a previous study performed in the community of Montezuma in 2018.

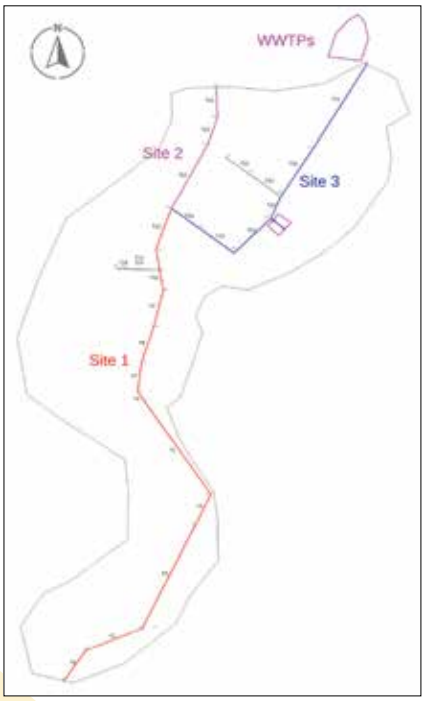

Figure 5: Sewer design.

Therefore, adding all the above-mentioned costs, the total estimated capital cost is approximately $376,129.

On the other hand, operation and maintenance costs were also extracted from existing literature which included the costs of labor, overhead, supplies, maintenance, operating administrations, utilities, safety and training, laboratory testing, and solids handling (EPA, 1999) for a total annual cost of $28,800.

Considering all the analysis and calculations previously stated, a user fee of $7.57 per month was estimated.

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