

MISSOURI WATER ENVIRONMENT ASSOCIATION

2024 Annual Fall Technical Conference

November 07, 2024

7:00 AM - 5:00 PM

Stoney Creek Hotel and Conference Center – Columbia, Missouri

Salon A

8:15 - 9:15 a.m.

Moderator: TBD

Funding in Moscow Mills

Rebecca Howley, GBA

Rebecca Howley has over 25 years of experience, all with GBA, developing solutions to meet client goals in evaluating and designing storm and sanitary sewer systems for small and large organizations. Her technical responsibilities include hydraulic modeling of gravity and pressure systems, designing sewers and lift stations, analyzing data, and recommending cost-effective methods to improve collection system and treatment performance. Her approach to project management is to form a collaborative team of experts to perform efficiently and closely track performance, budget and schedule. She lives in University City with her husband and a houseful of children.

ABSTRACT: Moscow Mills experienced effluent violations in 2010. This led to an Agreement of Consent with EPA in 2012. After developing a Compliance Plan associated with the AOC, the City began implementing the capital improvements and operations improvements over the next 8 years. The capital project consisted of closure of one treatment facility and construction of a lift station and force main to convey the sewage from its service area to the city's other treatment facility, along with some I/I rehabilitation work, financed by a combination SRF loan / grant. Following the capital project, the City continued to improve operations to meet compliance.

Salon B

8:15 - 9:15 a.m.

Moderator: TBD

Unlock Reliability & Efficiencies with AI-Driven Solutions

Kirk Wessel, The Turing Company

Kirk Wessel is a proven water leader specializing in AI & Digital Solutions helping to advance all water sectors through innovation.

ABSTRACT: The water/wastewater treatment industry faces a host of challenges including reactive maintenance, labor shortages, limited visibility, underutilization of data, and human errors. These complexities not only impede operational efficiency but also lead to cost escalations and environmental impacts.

Recognizing these challenges, Turing Company created TOPClear, a transformative AI-powered platform designed to enhance the reliability, sustainability, and efficiency of treatment facilities.

TOPClear leverages real-time data streaming combined with advanced machine learning algorithms to significantly improve productivity. By detecting anomalies and predicting maintenance needs, the platform ensures continuous optimal performance, thus mitigating

the risks associated with traditional reactive approaches. The integration of AI into our system transforms treatment processes by enabling predictive asset management,

streamlined operations and maintenance (O&M), robust data management, and comprehensive system integration.

Salon A

9:15 - 10:15 a.m.

Moderator: TBD

Federal and State Regulatory Update

Jay Hoskins, MSD; Lacey Hirschvogel, HDR

Jay Hoskins is the St. Louis MSD Assistant Director of Engineering for the Environmental Compliance Division.

Lacey Hirschvogel is HDR Water Quality Section Manager, located in Columbia, MO.

Lacey is also the chair of the MWEA Government Affairs Committee.

ABSTRACT: Review the most important federal and state water issues and happenings, such as

regulation/policy changes, legislative action (and inaction), and agency personnel changes.

Specific topics will include DNR fees, PFAS, nutrients, ammonia water quality criteria, state design regulations, Waters of the U.S., and Waters of the State.

Salon B

9:15 - 10:15 a.m.

Moderator: TBD

More Than Just Alarming

Kevin Stock, Streametric

Kevin Stock has 30+ years of experience in the Water & Wastewater industry. His expertise is in SCADA (Supervisory Control and Data Acquisition), controls, and IoT technologies. In 2003, Kevin founded Scadata and developed a signature turnkey SCADA (SaaS) software. He is a leader in the Water/Wastewater emerging digital technology platform and holds a US Patent. Currently, Kevin is the CEO at STREAMETRIC, a MANN + HUMMEL company, helping Water and Wastewater professionals, internationally, achieve better systems performance through Artificial Data intelligence via digital technology platforms.

ABSTRACT: 85% of Water/Wastewater Utilities in North Americas are forced to manage & maintain Infrastructure with 3 employees or less. And yet, they are fully responsible for the flawless operation of their key infrastructure that fuels their communities. In recent years, this lack of human resources & budgets often results in

shortcomings that affect preventative maintenance and proactive planning. Municipalities fall short because they simply cannot keep up with demands. Without the ability to predict, the assets (pumps) are run until failure. The solution to these overwhelming problems is to adopt modern monitoring and predictive solutions. Progress has already begun in this area, mainly within large utilities with the ability to adapt easily due to size and funding. This presentation introduces state-of-the-art monitoring solutions that can be adopted by small utilities in a cost-effective manner. Utility leaders will learn about the capabilities of modern monitoring solutions; the value of data related to advanced analytics; the positive impact of AI; and preventive maintenance. Based on use cases and case studies, this presentation will give examples on the ease of implementation and cost effectiveness. We will cover key technologies including flow estimations, pump health monitoring, real-time data, and alarms. The presentation also provides a platform for an exchange between

participants (utilities, engineers, manufacturers) to improve their understanding about existing challenges and opportunities. Currently, flow studies are projects that consume an immense number of resources and time. With more modern flow estimation (automated drawdown test), estimated flows can provide the utility accurate data without the cost of an expensive flow meter. This data can not only be essential for understanding pump performance and

health, but it is also valuable for engineers to plan expansion projects. In summary, this presentation should empower utilities to install and enjoy advanced data collection technology, deploying a continuous monitoring solution without needing to walk through the plant to check on things, for example each pump. Finally, water utilities can enjoy an efficient, reliable, and safer process with enhanced capabilities. Discover. Predict. Improve. www.streametric.io

Salon A

10:30 - 11:30 a.m.

Moderator: TBD

Developing Next Generation Stormwater Management Design Criteria

Andy Sauer, Burns & McDonnell

Andy is the National Stormwater Management Practice Leader for Burns & McDonnell's Water Global Practice. Andy has more than 26 years of experience in water resources and urban wet weather issues. He specializes in creating smarter, more resilient stormwater solutions that provide a greater public value. He has completed smart stormwater solutions to various urban settings, including green infrastructure within combined sewer areas, optimizing stormwater collections systems in older urban areas, and creating more holistic watershed solutions. His experience ranges from small, rural communities to large urban municipalities. He is currently leading teams updating regional stormwater design standards, completing comprehensive watershed modeling, and stormwater design. Andy is a registered professional engineer, an Envision certified sustainability professional, and the current chair of WEF Stormwater policy committee.

ABSTRACT: The KC Metro Chapter of APWA in cooperation with the Mid-America Regional Council and 31 municipalities is in the process of updating the stormwater design criteria for the Kansas City Metro Region. The Kansas City Metro Region has a vision to update the regional stormwater design standards to implement resilient stormwater management practices using a sustainable watershed management approach that manages risk, enhances value, and stewards of natural ecosystems. The goal of this vision is to produce a clear and concise design manual that addresses both stormwater quantity and quality for adoption by local communities throughout the metro area. This presentation will provide an overview of this comprehensive approach to stormwater design criteria with a multi-faceted approach to stakeholder engagement for adoption.

Salon B

10:30 - 11:30 a.m.

Moderator: TBD

Case Study on Stormwater Management on Urban Park Trail Sites Using the Infiltech Device

Kathleen Trauth, Infiltronics Environmental

Dr. Trauth is the owner and president of Infiltronics Environmental LLC, a company she

started to commercialize, Infiltech™, a stormwater management device. She also is an Associate Professor in the Department of Civil and Environmental Engineering at the University of Missouri (MU), where she teaches and

conducts research related to stormwater management. She is a professional engineer licensed in Missouri and New Mexico. Before joining MU, Kate worked at the New Mexico Environment Department and Sandia National Laboratories in Albuquerque.

ABSTRACT: Infiltronics Environmental LLC has developed the Infiltech™ system of devices, which manages stormwater by maximizing redistribution and infiltration of stormwater on a site. Infiltech™ is a tubular structure composed of aggregate-filled geotextile segments. Multiple tubular structures are placed end-to-end to create the system of devices. It is installed shallowly below ground in a slightly sloped trench. The system produces 3D flow, dictated by differences in hydraulic conductivities, as a result of different aggregate sizes in the different geotextile segments. The 3D flow helps to maximize infiltration into the surrounding soil and, in conjunction with utilizing several installations around a site, helps redistribute the water throughout a site, avoiding “mounding” of water in one area. The slightly sloped trenches the segments are placed in, in addition to the sedimentation basins often used with the system, produce a pressure head in the system, forcing more water into the surround soil than would infiltrate under passive conditions. Through soil moisture data collected on research sites, it has been confirmed that the system has an essentially continuous saturated “plume” of soil around it, even with large time durations between rain events. This large,

pre-saturated, surface area allows for faster and more widespread infiltration of water throughout the system and surrounding soil when a rain event does occur, further maximizing potential infiltration.

The Infiltech™ system of devices has been installed at Forest Park in St. Louis, MO. These installations have focused around the Park’s extensive trail system, and work to manage areas where the trail often floods. This flooding results in a loss of use of the trail by patrons, potential damage to surrounding vegetation as patrons try to avoid the flooded areas, potential safety concerns, and increased physical labor required to keep the trails safe and usable, particularly in winter where this flooding can result in ice-covered trails. Additionally, the regular flooding and icing of trails results in accelerated degradation of the trails and a shorter functional life.

In this case study we will discuss the process followed to determine where stormwater needs to be managed to handle a flooding section of trail in Forest Park and what method should be used to manage it, often utilizing Infiltech™. We will discuss how a site and landscape are analyzed, tools and methods used to determine how much water needs to be managed, how we design based off of the information collected and the needs of the Park, our installation process, the site maturation process, and the comparison of the site before and after installation.

Salon A

12:30 - 1:30 p.m.

Moderator: TBD

Kansas City Blue River Biosolids Project Construction Summary and Update

Alan Ringhausen, Black & Veatch

Alan Ringhausen is an experienced Senior Engineering Manager with a demonstrated history of working in the municipal engineering space.

ABSTRACT: This presentation will update on the progress of the Kansas City, Missouri Water Services Blue River Wastewater Treatment Plant

Biosolids Improvements Project (Biosolids Improvements Project) which is being delivered as fixed-price design build. This project replaces the incineration process that had been part of the biosolids handling for Kansas City since the 1980’s with a thermal hydrolysis process (THP) which creates a Class A biosolids. The Design-Build team began work on the project in January 2021 and startup and commissioning is scheduled to begin in spring of

2024. With two years into the project, the design is complete and construction is underway.

Salon B
12:30 - 1:30 p.m.
Moderator: TBD

Lessons Learned from Recuperative Membrane Thickening

Tom Crowley, Carollo Engineers

Tom Crowley is a project manager in Carollo's Kansas City office. He has over 30 years of experience in the water and wastewater industry. He has bachelors degrees in chemistry and civil engineering and a masters in environmental engineering from the University of Illinois.

ABSTRACT: The purpose of this presentation is to present several case studies from around the country of designs and installation of recuperative thickening utilizing membranes

prior to dewatering. The case studies will focus on the key design parameters and assumptions that impact operations including the importance of a holistic approach to design and operations that considers the impact of upstream processes on the thickening process and how operations can impact downstream dewatering operations. The lessons learned will focus on operational and design adjustments made to the upstream and thickening process to improve performance of dewatering operations.

Salon A
1:30 - 2:30 p.m.
Moderator: TBD

Little Blue Valley Primary Heat Exchanger Replacement

Dave Yates, Brown & Caldwell

Dave leads the Missouri Operations for Brown and Caldwell and is based in St. Louis where he opened the office in 2017. He has more than 28 years of experience in the water and wastewater industry. He graduated in 1995 with a BSCE from the University of Missouri-Rolla.

ABSTRACT: In 2019, Little Blue Valley Sewer District (LBVSD) was faced with needing significant repairs to its primary heat exchanger

(PHE). Brown and Caldwell (BC) was contracted to inspect the PHE to evaluate and provide improvement recommendations. The evaluation deemed that the PHE needed to be replaced and BC began design of the new PHE. Following design completion in late 2021, the project went to bid and was awarded in mid-2022. The new PHE was completed in late 2023 and put into operation. This presentation will walk you through the evaluation, design, and construction of the project.

Salon B
1:30 - 2:30 p.m.
Moderator: TBD

Upgrading Lagoon Based Treatment Systems to Meet More Stringent Limits for BOD, TSS & Nutrient Removal

Steve Squires, Lemna Environmental Technologies

Steve Squires has over 25 years of experience in the water/environmental industry and is the

Regional Sales manager of Lemna Environmental Technologies (LET). LET is a recognized leader and innovator in lagoon-based process technology and has advanced lagoon treatment from simple facultative systems for BOD and TSS treatment

to advanced systems capable of nutrient removal. LET's expertise encompasses all aspects of wastewater project development from conceptual design to final commissioning and ongoing customer support.

ABSTRACT: Lagoon facilities across the state of MO are being affected by new treatment regulations, primarily focused on Ammonia removal, but additional requirements for Phosphorus removal and Total Nitrogen removal are right around the corner.

Lemna Environmental Technologies (LET) will present an updated approach for lagoon-based wastewater treatment technologies

demonstrating how various emerging technologies can be retrofitted into existing facilities in order to meet nearly any treatment challenge, including low ammonia, phosphorus, Total nitrogen, BOD and TSS. The discussion will include a historical review of lagoon technologies common to the region along with a detailed discussion of several project specific case studies of facilities operating in the area. Operating data, construction sequencing and operations criteria will be shared with the audience.

Salon A

2:45 - 3:45 p.m.

Moderator: TBD

Aerobic Digestion - Old Challenge, Innovative Solution!

Freddy Kade, EnviroMix

Mr. Kade has a Bachelor's Degree in Civil Engineering, and a Master's Degree in Environmental Engineering from Marquette University in Milwaukee WI. Master's research was focused on enhanced anaerobic digestion using TPAD for the City of Janesville WI. Mr. Kade has almost 20 years of experience working for technology manufacturers in municipal and industrial wastewater treatment such as Siemens/Evoqua, Parkson, and Environmental Operating Solutions. Mr. Kade's expertise includes Biological Nutrient Removal processes and Biosolids Management. Mr. Kade is a licensed professional engineer in the State of Wisconsin.

ABSTRACT: "Traditional aerobic digestion uses diffused aeration to both deliver oxygen and mix; a seemingly simple approach to achieve EPA 40 CFR Part 503 Class B Solids using a single technology. Aerobic digestion is frequently mixing limited, especially in long sludge age or extended aeration processes. When excessive oxygen is delivered, the result is wasted energy, process foaming, depleted alkalinity, dewatering challenges and costly polymer dosage.

Decoupling aeration from mixing is the next

innovation, whereby compressed gas mixing provides the necessary mixing intensity, sludge uniformity, and orientation to work with, not against, aeration patterns in an aerobic digester. Data will be presented on implementation of decoupled aeration from mixing with diffused aeration and compressed gas mixing at the Benton plant including operating aerobic and anoxic cycles, DO/ORP data and volatile sludge reduction. Other plants that have seen similar benefits will also be highlighted.

Information presented will further establish that, aerobic digestion with decoupled aeration from mixing using diffused aeration and compressed gas mixing: (1) is well suited for thickened sludge applications, (2) provides substantial power savings compared to traditional aerobic digestion and other mixing technologies, (3) is effective in mixing tankage with challenging geometries (4) provides process benefits to the entire treatment process, and (5) creates short payback periods as an alternative to traditional aerobic digestion.

Salon B
2:45 - 3:45 p.m.
Moderator: TBD

Operational Challenges for Generational Assets

Pat Baldera, Black & Veatch

Pat Baldera is a Water & Wastewater Professional Engineer.

ABSTRACT: The mission of water and wastewater infrastructure requires complex and integrated projects designed to meet current and projected customer and community requirements. The design life of these installations may be up to 50 years and the intended use of specific equipment can range from just a few years to over 25 years in active service. Budgetary and other constraints often extend the service life well beyond the intent while operations staff are tasked with providing uninterrupted service in perpetuity. In order to be successful even in the short-term, designers

must provide useful redundancy to support maintenance activities and operational flexibility balanced with simplicity. In addition to changing regulatory requirements, shifts in local population and industry, community priorities, and climate change coupled with the transition of available workforce and institutional knowledge presents additional challenges to operations which are often met with iterative repurposing and incremental field adjustments at odds with the original design intent. The presentation will discuss field encountered scenarios illustrating common issues with generational operation of water & wastewater assets and present lessons learned which may be applied to current operations and future planning initiatives.

Salon A
3:45 - 4:45 p.m.
Moderator: TBD

Are You Dense? Well, You Should Be!

Bridget Moore, Jim Fitzpatrick, Black & Veatch

Jim Fitzpatrick lead's Black & Veatch's wastewater and biosolids process engineering group. He has 30 years of experience on wastewater projects, specializing for the last 20 years in best practices and technologies for nutrient removal and recovery and wet-weather resiliency. He holds a Missouri PE license and a master's degree in chemical engineering. He is happiest when he's outdoors enjoying nature on, in or near the water with family and friends.

Bridget Moore is an Engineering Manager with experience designing and managing a wide array of projects in Missouri, Kansas, Oklahoma, and Arkansas, including: water main relocations, large-diameter transmission main improvements, elevated storage tanks, wells, booster pump stations, master planning, and water and wastewater treatment plant rehabilitation and expansion in addition to sanitary sewer rehabilitation projects, lift station

designs, and more. She is a professional engineer licensed in Kansas and Missouri and holds a civil engineering degree from Rockhurst University.

ABSTRACT: Densifying activated sludge biomass in conventional treatment processes generally offers 20 to 30% increase in organic load treatment capacity and is one of the most cost-effective ways to optimize the performance, reliability, and resiliency of most activated sludge treatment processes. Some additional benefits are enhanced biological phosphorus removal (EBPR), simultaneous nitrification and denitrification (SND), greater tolerance to toxicity, lower energy demands, and lower sludge yields. This presentation will overview design and operational approaches used to transform nearby conventional activated sludge facilities into densified activated sludge (DAS). Data from full-scale operations will demonstrate the following key features, including: (1) Bio-selector zones – Food to mass (F:M) loading

rates, selector zone effluent rbCOD, and consistent feast and famine conditions in the aeration basins are key to granulation and biomass densification. (2) Selective wasting - Aeration basin surface wasting will be compared to a newer method that uses WAS hydrocyclones (inDENSE®). (3) Aeration control and DO setpoints - The ability and advantages of operating at low DO setpoints will be

discussed. (4) BNR synergies –DAS complements mixed liquor fermenters for side-stream EBPR (S2EBPR) and SND. Data from full-scale operations will demonstrate the above approaches. These features are included in the design of process intensification upgrades to the Bentonville WRRF to increase its capacity from 4 mgd annual average to 7.7 mgd annual average and 28.5 mgd peak daily average.

Salon B

3:45 - 4:45 p.m.

Moderator: TBD

Energy Management at WRRFs - Is Hydrogen a Viable Alternative?

Dale Gabel, Andrew Marsh, Carollo

Dale Gabel, PE, BCEE, Vice President and Client Services Manager serves as Carollo's Midwest Wastewater Technical Practices Lead with 45 years of experience in wastewater treatment engineering, design, and construction support. He served as the project manager for the City of St. Cloud's Renewable Energy Improvements Project and the City of Cedar Rapids WPCF Clean Hydrogen Study. He has BS and MS degrees in Civil Engineering and is a registered Professional Engineer in six states.

Andrew Marsh has more than 29 years of experience providing water services for municipal and industrial clients.

As an Industrial Practice Leader, he has provided high strength industrial water and wastewater treatment solutions to clients spanning numerous sectors and geographies across North America, including ADM, Cargill, Engie, National Beef, PepsiCo, and others.

ABSTRACT: Green hydrogen, that is hydrogen produced with renewable energy, is a likely energy source to decarbonize heavy transportation and other industries. The production of hydrogen through electrolysis produces pure oxygen and thermal energy as green byproducts, which can be used at Water Resources Recovery Facilities (WRRFs). Two case studies will explore the viability of integrating hydrogen production at WRRFs, the full-scale demonstration project at St Cloud, MN and the feasibility study at Cedar Rapids, IA. The St. Cloud project is focused on the commercial production of hydrogen, whereas the Cedar Rapids study is focused on pure oxygen production. Both projects include the beneficial use of thermal energy and oxygen byproducts. These projects will provide reasonable bookends for the assessment of integrating electrolyzers into WRRFs.