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New York Qualifications of Operators of Wastewater Plants

WWT

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Approval Details:

The New York State DEC has approved WEFTEC 2023® for Renewal Training Credit hours for operators. The training program is eligible for up to 30 renewal contact hours per person, for the entire conference (see the attached spreadsheet).

NYSDEC assigned Course Approval Number **RTC-24355-23** to this conference. Please use this number when submitting any information regarding this training course.

After completing the training program WEF will supply CE documentation to the NYSDEC:

- A copy of this letter.
- A copy of the Course Roster (form 92-14-32 or equivalent).
- One sample copy of the course completion notice/letter.

The course provider can issue partial credit at their discretion. Please see attached list of NYSDEC approved sessions...

| Session Number | Session Title | Session Description | Learning Objectives | New York Wastewater Treatment Plant Operator Renewal Contact Hours | Date | Start Time | End Time |
|----------------|--|---|---|--|-----------|------------|----------|
| 218 | Full-scale Thermal Drying System Implementation | How to recognize various aspects of how thermal drying can be implemented as a bioenergy solution for biosolids management will be the primary learning point for this session's participants. The success of a constructed large-scale rotary thermal drying system will be presented. In addition, the novel integration of hydrogen as an alternative energy source for thermal drying is reported. Lastly, how pyrolysis can be applied after drying for PFAS compound destruction and production of biochar. Participants will be able to evaluate and determine how innovative aspects of thermal drying can be incorporated into full scale systems. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) summarize how to implement full-scale rotary drying systems, (2) evaluate innovative aspects of thermal drying, and (3) assess how pyrolysis can be integrated with thermal drying. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 219 | Technology Driven Optimization of Collection Systems | Session participants will have the opportunity to learn from the perspectives of both public and private utilities about how real-time data solutions, predictive operations, and maintenance strategies create a more resilient collection system. Discussion breaks distributed throughout the session will encourage conversation and provide direct access to the speakers. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) identify technologies for increasing cleaning efficiency, (2) interpret real-time information based on data trend-analysis, and (3) differentiate decision-making processes for real time operations. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 220 | Advancements and Optimization with Chlorine, Peracetic Acid, and Performic Acid Disinfection | Increasingly utilities are having to meet various and sometimes competing regulatory limits for disinfection while doing so in a financially responsible manner. This challenge has led utilities to look for opportunities to optimize their disinfection process or investigate new alternatives. This session presents approaches balancing bacteria and disinfection byproduct limits with chlorination, optimizing peracetic acid disinfection, and advances in performic acid based on pilot study results. | At the end of this session, attendees will be able to (1) describe how to balance disinfection goals and THM limits in a wastewater application with high chlorine demand, low effluent ammonia, and tight limits for coliform and DBPs, (2) explain advances in application of performic acid (PFA) at pilot scale in the US in disinfection efficacy and toxicity, and (3) compare dose optimization strategies for application of peracetic acid (PAA) for wastewater disinfection. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 221 | Wastewater Surveillance: How Does the Sewer Impact the Data? | Although the use of wastewater surveillance has grown rapidly over the past few years, many questions remain about the quality and variability of data from a 'dirty' matrix like wastewater. This session will explore the impacts on data quality of degradation of virus genes in sewers, as well as impacts of wastewater components such as industrial discharges and stormwater. | At the end of this session, attendees will be able to (1) describe how degradation of virus genes in wastewater impacts measured results, (2) give examples of how industrial discharges can interfere with measured results, and (3) explain the impacts of stormwater on measured results. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 222 | Managing the Third Effluent Part I | The key to identifying odor sources and technologies is to monitor emissions and apply modeling tools to mitigate them. This session explores plant wide monitoring and modeling as well as the Biotrickling Filter odor control technology as a means to mitigate odors. Interactive Session Conversation & Input | At the end of this session, participants will be able to (1) establish the methods and tools to evaluate odors at WRRFs, (2) recognize that Biotrickling Filters can use varying medias, and (3) examine the relationship between vapor phase odor control and corrosion issues. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 223 | Extracting Carbon for Nutrient Removal | Influent wastewater often has sufficient carbon to drive biological nutrient removal of nitrogen and phosphorous. However, the carbon is not always in the required biodegradable, soluble form and at times (specifically for nitrogen removal) external carbon must be supplemented. Adding external carbon for nutrient removal burdens the rate payers and is considered as source of greenhouse gas emissions. This session explores the extraction of carbon from the primary sludge, RAS and digested sludge via hydrolysis and fermentation. Interactive Session Panel Discussion | At the end of this session, participants will be able to (1) identify carbon extraction opportunities and challenges, (2) explain Hydrolysis and fermentation of RAS, Digested, and Primary sludge, and (3) identify opportunities for application of free carbon on PdNA and EBPR (N and P removal). | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 226 | Alternative Approaches to Intensify Secondary Treatment | Densification is a hot topic in activated sludge design and operation due to its potential to increase sludge settleability and thus decrease the required footprint for achieving treatment objectives. However, densification is just one way to intensify secondary treatment. Several other alternative technologies exist which can achieve similar or more reductions in footprint, including Integrated Fixed-film Activated Sludge (IFAS), Membrane Aerated Biofilm Reactors (MABR), and Membrane Bio Reactor (MBR). During this interactive session, expert practitioners will present recent case studies and updated analysis of these three alternative technologies which will allow audience members to understand the relative advantages and disadvantages of each alternative and where they may be most applicable. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) summarize intensification technology alternatives to densification, (2) compare advantages and disadvantages of intensification technologies, and (3) identify potential applications for alternative intensification technologies. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 227 | Thinking Outside the Basin: Auxiliary Wet Weather Treatment | Treating wet weather flows doesn't require a costly secondary expansion, construction of storage or equalization. Through three case studies, participants will learn about strategies to address wet weather flow at the wastewater reclamation facility using peak flow management and auxiliary treatment while meeting regulatory effluent limits. Presenters will describe the strategies used to gain regulatory consensus on the framework or new technology applications. | At the end of this session, attendees will be able to (1) identify of out of the box ways to address wet weather flow without storage or equalization, (2) develop strategies to meet plant effluent limits and gain regulatory consensus while addressing wet weather flow, and (3) address wet weather flows cost effectively, without plant expansion. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 228 | Improving Biosolids Treatment Efficiency | Maximizing volatile solids destruction and improving biogas production is of critical importance for many utilities for sustainable operations. To accomplish this objective, it is important to understand how bioaugmentation and other technologies such as hydrothermal liquefaction would improve the digestion process. In this session, the attendees will learn about different biosolids treatment technologies for improved volatile solids destruction and biogas generation. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) identify bioaugmentation methods to improve biogas production and digester efficiency, (2) evaluate the efficacy and scalability of emerging biosolids treatment processes under real world operating conditions to mitigate risks surrounding early adoption of new technologies, and (3) assess the environmental and economic performance of the full-scale implementation of the emerging biosolids treatment options. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 231 | Optimizing Energy Investments Part II: Energy Use is in the Details | Following the preceding session's summary of Energy Master Planning, this session will include three example Energy-Use case studies. Each case demonstrates new tricks that designers, operators, and management have used to squeeze the most out of limited energy resources. Each case also emphasizes how, whether optimizing energy use or just saving dollars, success lies in site-specific, geographical, and contextual details. Two of the cases involve onsite power generation (CHP): one from the perspective of design engineers; with the second showcasing tools that allow operators access to information allowing energy-savings decisions on the fly. The third and final case study involves more CHP but also adds sludge drying, landfill gas, and capacity needs to the mix; describing how decisions enable success (and avoid limitations and hard choices). Interactive Session Case Study Analysis | At the end of this session, participants will be able to (1) compare how using data in different ways, allows energy use and cost savings, (2) recognize how integrated, complex systems can provide operational efficiency and resiliency, and (3) determine how monitored real-time data can be leveraged for multiple benefits. | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |
| 233 | Ozonation: Water Reuse on a New Level | Helping utilities to practice water reuse, Integrating the biological and ozonation models was possible to achieve aeration savings, while using less ozone could be dosed at the final treatment step before discharge is the overall objective of this session. We will also discuss how to use CFD-Amozone kinetic model for optimal design the new advanced oxidation reactors. | At the end of this session, attendees will be able to (1) evaluate the impact of Ozone on Water Reuse in treatment performance, (2) analyze the influence of Ozone on By-product formation, and (3) relate the efficiency of Ozone on micro-constituent destruction | 1.50 | 10/2/2023 | 3:30 PM | 5:00 PM |

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|----------------|---|---|---|--|-----------|------------|----------|
| 301 | Translating Bench Scale to Full-Scale Operations: Is Food Waste Co-digestion Right for You? | Water Resource Recovery Facilities (WRRFs) are increasingly investigating and implementing co-digestion of food waste to maximize biogas production and generate revenue from tipping fees and biogas energy recovery, while reducing organics landfilling and its associated greenhouse gas emissions. This session will provide an introduction on food waste co-digestion covering both the positive and potential negative impacts, an academic perspective describing how co-digestion bench scale studies are conducted and the findings that can be identified, and a utility-centric case study on how bench scale study findings were used to increase the accuracy of the results of a feasibility study. Interactive Session: Facilitated Discussion | At the end of this session, participants will be able to (1) demonstrate the benefits of conducting a bench or pilot scale study to determine expected digestion performance and biogas production to refine results of a co-digestion feasibility study, (2) develop a general approach to identify process and capacity limitations associated with food waste co-digestion - including food waste receiving and pre-treatment, digestion, dewatering, and biogas utilization, and (3) identify food waste pre-processing technology options to produce high quality slurry feed, including slurry quality, layout/location, and cost considerations. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 302 | Innovative Project Delivery Methods | Not a one-size fits all standard construction project. This session will feature various implementation techniques from new construction design/build, construction manager at risk, and emergency response to a large, failed gravity line. | At the end of this session, attendees will be able to (1) identify emergency preparedness and response, (2) recognize design/build delivery methods, and (3) understand the construction manager at risk method. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 303 | Pathogens and Indicator Update for 2023 | We monitor indicator organisms to confirm microbiological safety of wastewater effluent and biosolids. Indicators are not pathogenic, but their presence mimics the behavior of pathogens in wastewater and biosolids. Traditionally the most common indicators are fecal coliform, E. coli and enterococci. However, the removal or inactivation and decay of these indicators does not always reflect that of viruses or spore-forming bacteria, which calls into question their efficacy as indicators. In this session, presenters provide evidence related to the inactivation of viruses by chlorination and the inactivation of endospores in wastewater and biosolids. | At the end of this session, attendees will be able to (1) discuss the applicability of coliphage as indicators for virus inactivation with chlorine, (2) identify the differences in Bacillus species and their potential as indicator organisms, and (3) describe the overall impact of indicators and current status of implementation and future directions. | 0.75 | 10/3/2023 | 8:30 AM | 9:15 AM |
| 304 | The BNR Instrumentation and Controls Selection Adventure | Is there an app for that? Currently, there is no centralized resource detailing the various biological nutrient removal (BNR) control systems, the commercially-available sensors and analyzers that inform the real-time responsive controls, their performance and capabilities, and the associated operation and maintenance (O&M) procedures and costs. WRF Project No. 5087, titled Implementation of Innovative Biological Nutrient Removal Processes through Improvement of Control Systems and Online Analytical Measurement Reliability and Accuracy, aims to fill the current gap in understanding of online, instrument-driven BNR control schemes and their reliability and performance with decision support tools for operators, engineers and utility directors. This session will highlight outcomes of the WRF project and provide the audience with an app they can use to evaluate the applicability of BNR control systems and associated sensors and analyzers at their water resource recovery facilities (WRRFs). Additionally, utility representatives will share their experiences with implementation and operation at their WRRFs. Interactive Session Case Study Analysis | At the end of the session, participants will be able to (1) identify various BNR control systems & related instrumentation for real-time controls, (2) narrow to short list of BNR control systems & related instrumentation applicable to their WRRF, and (3) incorporate key O&M and cost criteria into selection evaluation. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 305 | Sidestream Nitrogen Removal: From Established to NextGen | In this session, attendees will be presented with a review of full-scale experience of sidestream treatment facilities ranging from conventional nitrification/denitrification to deammonification. Startup and operation of multiple manufacturers for each will be reviewed and compared against next generation technologies. Interactive Session Panel Discussion | At the end of this session, participants will be able to (1) describe the nitrogen removal processes, full nitrification/denitrification and shortcut, (2) determine available sidestream nitrogen solutions and operational experience, and (3) identify next generation sidestream processes. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 308 | The Big Bad Blower: Huffing and Puffing Air Through Your Aeration Basins | Many factors influence technology selection and sizing of aeration blowers. This session will illustrate a practical methodology for sizing aeration blowers including the use of dynamic process modeling as a tool to assist in sizing aeration blowers; how environmental conditions impact oxygen transfer and blower design, and a users' evaluation of installed blower technologies. | At the end of the session, attendees will be able to (1) describe how incorporation of driving factors into a dynamic process model impact the sizing of aeration blowers, (2) assess the impact that environmental conditions such as air and water temperature variation and elevation impact oxygen transfer and blower sizing, and (3) develop a questionnaire for evaluating installed users' experience with the different blower technologies. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 309 | Low Carbon BNR Fundamentals and Controls | Low dissolved oxygen (DO) operation in biological nutrient removal (BNR) systems will be the focus of this session. Participants will learn about the benefits and challenges of operating BNR systems at low DO levels, including increased nutrient removal efficiency, reduced energy consumption, and decreased sludge production. The session will cover strategies for optimizing BNR performance under low DO conditions. Attendees will also learn about monitoring and control strategies for maintaining stable BNR performance under low DO conditions. The session will be led by experienced wastewater treatment professionals and will include case studies and interactive discussions. | At the end of this session, attendees will be able to (1) discuss the principles of low dissolved oxygen (DO) operation in biological nutrient removal (BNR) processes, (2) identify the key operational parameters and strategies for implementing low DO operation in BNR, and (3) analyze the impact of low DO operation on process performance and effluent quality. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 310 | Updates on Microplastics Occurrence, Regulation, and Removal | Join us for an update on the latest in microplastic (MP) occurrence, regulations, and treatment! This session includes speakers with perspectives across water matrices: wastewater, stormwater, and runoff from industrial facilities. Results will be shared from (1) the MP occurrence database from WRF 5088, (2) control strategy development for a manufacturing facility, and (3) a cross-season investigation of MP occurrence and removal at a water reclamation facility. Stay for the facilitated discussion of the consequences. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) identify and interpret current and anticipated regulatory language for microplastic treatment, (2) compare microplastic occurrence across water matrices (storm, waste, and manufacturing), and (3) recommend best management practices based on mass balance. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |
| 317 | Roadmap! Taking Integrated Planning for Municipal Wastewater and Stormwater on the Road | In this interactive facilitated discussion session sponsored by the WEF Integrated Planning Task Force, the fundamentals of integrated planning will be shared through an overview of the Task Force's integrated planning roadmap, including what integrated planning is, what is included in an integrated plan, and how to get started developing an integrated plan. The Task Force will also share their plans to help utilities and regulators become more knowledgeable about integrated planning and to begin using it for NPDES permitting and enforcement actions. Following the roadmap overview, there will be a facilitated panel discussion of case studies with utility representatives where participants will learn when integrated planning is likely to be most successful, reinforced with case study experiences, and how an integrated plan can be efficiently developed for a community. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) Identify when integrated planning is likely to be beneficial for a community, (2) assess the content of an integrated plan and how to develop an action plan for completing an integrated plan, and (3) determine how an integrated plan can go beyond Clean Water Act requirements to result in enhanced ecosystem and other benefits. | 1.50 | 10/3/2023 | 8:30 AM | 10:00 AM |

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| 401 | Behavior of Emerging Contaminants in Thermal Treatment Processes | Emerging contaminants in biosolids have often posed challenges and concerns to their beneficial uses regarding the potential impacts on public health and the environment. There are renewed interests in thermal technologies such as incineration, pyrolysis, and gasification for biosolids treatment to address such concerns. The behavior of various emerging contaminants under various thermal treatment is not well known, however. This session presents insights into how some of these emerging contaminants in biosolids may behave when subjected to various thermal treatment processes. Interactive Session Conversations & Input | At the end of this session, participants will be able to (1) compare and assess a selective group of innovative processes to address CECs and (2) evaluate and learn about novel systems to effectively reduce the knowledge gap regarding pollutants in biosolids. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 402 | Pump Stations: Lessons Learned | Three unique pump station rehabilitation and replacement projects will be discussed during this session, exposing the listener to the lessons learned by each one. The projects vary in size and each improve operations by their type of rehabilitation to specific components within the pump station. | At the end of this session, attendees will be able to (1) recognize the challenges by rehabilitation/replacement, (2) describe the lessons learned during project planning and implementation, and (3) identify observations of improved operations, capacity and reduction of system failures. | 1.00 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 403 | Disinfection in the 2020s | In this session, operators speak about issues associated with operating and maintaining disinfection processes while dealing with supply chain issues, staff turnover, increasing budgets, and implementing new technologies. Operations staff from three wastewater facilities will present their specific issues, each using a different disinfection process (Hypochlorite, UV, and PAA). A facilitated discussion on the challenges of operating disinfection systems follows the presentations. | At the end of this session, participants will be able to (1) identify the different factors that can impact the disinfection process, (2) describe how to adopt a program of continuous training to address the issue of staff turnover, and (3) discuss case studies on how to ensure disinfection compliance. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 404 | Lessons Learned from Early PdNA Implementation | Partial denitrification anammox (PdNA) is an emerging approach to provide low carbon nitrogen removal. This session provides an overview of PdNA design and operational considerations resulting from long-term pilot operation and full-scale experience. | At the end of this session, attendees will be able to (1) establish the principals of PdNA implementation, (2) define the impact of carbon source on PdNA, and (3) compile startup strategies and operational strategies. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 405 | Applications of Machine Learning in Full-Scale Nutrient Management Part I | As part one of a two session series, this session will present the findings and results of the WRF Project 5121: Development of Innovative Predictive Control Strategies for Nutrient Removal. This first session is focused on presenting the technical approach the team took to applying machine learning (ML) to nutrient control in full-scale facilities in a controller named ODIN (Operational Decision-making Intelligence for Nutrient control). Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) describe what the WRF 5121 project is accomplishing, and (2) give examples of why does the user interfaces matter so much in this application, and (3) identify what is a Hybrid controller and what are its components. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 409 | Advancing Low-energy Biological Nitrogen and Phosphorus Removal Through Low DO Operation | The potential for a low capital investment that achieves nutrient removal and reduces energy is readily applicable to many WRRFs. However, current manuals of practice and historical understanding of operations assume that low DO operation creates process performance challenges. For example, low DO operation has historically been linked to poor settling sludge and lower microbial rates (e.g., low nitrification rates), which results in the design of larger volumes for treatment and undermines intensification outcomes. This traditional understanding has persisted from systems with complete mix activated sludge, but the application of anaerobic selector zones and active carbon management affect biological kinetics and population selection, enabling low DO operation while maintaining good settleability and nutrient removal. It is only when these mechanisms are understood can they be fully exploited to intensify treatment. This session will cover the current state of the industry as well as recent findings from an ongoing Water Research Foundation study (WRF 5083) investigating the benefits and mechanisms of low DO operation. Interactive Session Knowledge Development Forum | At the end of this session, participants will be able to (1) discuss benefits of low DO operation and operational approaches and challenges associated with operating a low DO BNR system, (2) describe the importance of carbon management and importance of selector zones to optimize SND and EBPR while preventing poor settleability, and (3) discuss the importance of batch testing methods along with process modeling in design and operation of low DO BNR systems. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 410 | Connecting Molecular Biology Sensors to EBPR Performance | The applications of molecular biological approaches and bio-electrochemical sensors to enhanced biological phosphorus removal (EBPR) processes will be the focus of this session. The presentations will include discussion on pilot studies at full-scale facilities and research into application of advanced tools for assessing the health/operation of EBPR systems. The target audience is research-focused consultants, utilities, academics, and designers. | At the end of this session, attendees will be able to (1) connect genetic sequencing data and process data to corroborate potential causes of EBPR process upsets, (2) identify novel and active PAOs in EBPR configurations through a stable isotope probing method, and (3) leverage online bio-electrochemical sensors to inform plant operations of influent carbon loadings and guide operation of EBPR processes. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 411 | Making Forever Chemicals Gone Forever | Recent advances in treatment of PFAS in raw and reclaimed wastewater will be covered during this interactive session. It highlights PFAS treatment by adsorption and electrochemical oxidation. It unveils the fate of PFAS through wastewater treatment and reuse systems. The session is appropriate for researchers and practitioners that deal with PFAS in water and wastewater. Interactive Session Facilitated Discussion | | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 415 | Recognize the DRIFT in Asset Management Implementation | Asset Management Practice has been maturing over the last decade. While some of the best practices and principles are consistent throughout these years, it is important to learn from the organizations implementing and advancing their asset management programs. In this session, you will recognize those lessons as well as implement tactical initiatives to address a few selected areas of asset management. Interactive Session Conversation and Input | At the end of this session, participants will be able to evaluate how to implement a program to prioritize pump station operations and maintenance. | 1.00 | 10/3/2023 | 1:30 PM | 2:30 PM |
| 416 | Reconsidering Biological Treatment for Water Purification: Reuse-nutrient Removal-nexus I | As the first of the two-session series 'Reuse-Nutrient Removal Nexus,' this session will highlight considerations for designing secondary to tertiary treatment processes with the goal of producing feed water for full advanced treatment to produce purified water. There have been limited efforts to integrate the design considerations for biological treatment processes with downstream water purification processes for water reuse even though the impacts of the upstream treatment on the advanced treatment have been recognized. This session will highlight how recent advances in biological nutrient removal processes are integrated into holistic approaches to produce purified water. Traditional Session Buzz Session | At the end of this session, attendees will be able to (1) identify how secondary treatment process will affect the design and operation of water purification process, and how the considerations for water purification process will affect the upstream treatment processes, (2) evaluate the implications of process densification on the downstream water purification process, and (3) recognize importance in integrated approach for the whole liquid treatment trains to achieve better water purification facility planning and design. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |
| 417 | Long-term Control Planning and Consent Decree Orders | USEPA will open this session by providing an overview of the status of long term control planning, CSO plans and the future of both. The session will then have presentations about negotiating post-construction long term control plan compliance work plans to confirm that actual performance of constructed facilities meets anticipated performance identified in LTC Plans, and about successful elements of a 100% complete, 20-year CSO control program, including its private property program, infrastructure coordination efforts, and funding sources. | At the end of this session, attendees will be able to (1) Apply EPA's perspective to current and future LTC Planning, (2) Identify USEPA's specific issues associated with regulatory review of Post Construction Compliance Monitoring (PCCM) plans and ways to resolve them to achieve work plan approval, and (3) assess multiple strategies for reducing costs and increasing benefits of large, programmatic linear utility (specifically sewer separation) implementation projects. | 1.50 | 10/3/2023 | 1:30 PM | 3:00 PM |

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| 418 | Creating Renewable Revenue Streams with RNG | Many utilities are evaluating upgrading biogas to RNG standards for pipeline injection and RIN sales, as an option to continuing to flare excess biogas. Many states and cities are enacting GHG emission reductions and wastewater utilities are often the single largest electrical users and therefore critical for achieving GHG emissions. Upgrading biogas to RNG can provide an additional source of utility revenue while simultaneously reducing overall carbon emissions. Unfortunately, the steps required for successful implementation of converting biogas-to-RNG can be complex. There are multiple contractual agreements required between the utility producing RNG and the gas company pipeline operators including interconnect agreements, operating agreements, and transportation agreements with the required quality of RNG fuels differing regionally. This session will provide a comprehensive review of the many intricacies involved in the upgrading of biogas to renewable natural gas standards for pipeline injection and ultimate distribution and sale of renewable identification number (RIN) credits. Interactive Session: Panel Discussion | At the end of this session, participants will be able to (1) recognize and categorize the steps required for implementing and managing a successful RNG upgrading system, (2) develop greater understanding of RNG plant operation and practice process optimization strategies including designs, diagnose and troubleshooting for achieving optimal gas quality and compare the four most common processes, (3) analyze and distinguish safety improvements that may be needed within the existing wastewater treatment facility to ensure safe operation, and (4) assess and compare RIN markets, RIN sales and commodity fuel markets for maximizing revenue generation. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 419 | Perspectives on Inflow and Infiltration Reduction Cost Effectiveness | There has been a national discussion about whether I/I elimination or reduction projects are cost effective. Utilities need better information on the costs and benefits of I/I reduction, including how to measure I/I reduction after construction projects are completed, how to document the effectiveness of I/I reduction measures, and what are the metrics for measuring I/I reduction cost-effectiveness. During this session, attendees will have the opportunity to partake in an open debate to help answer the many questions surrounding this topic. The session will address questions such as: How are utilities currently measuring I/I reduction? How are utilities currently measuring cost effectiveness of I/I reduction work? How are utilities determining system and basin-level points of cost-effective I/I reduction? What the practices of utilities conducting I/I reduction in the most cost-effective manner? Interactive Session Debate. | At the end of this session, participants will be able to (1) identify the fundamental challenges of I/I reduction programs and technologies, (2) describe approaches for determining cost-effective I/I reduction when compared to transporting and treating, (3) describe the typical approaches for measuring I/I reduction after construction is completed, (4) apply different approaches for documenting cost effectiveness of I/I reduction activities, and (5) identify opportunities for optimizing their programs to better document I/I reduction and I/I reduction cost effectiveness, with particular focus on private property work. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 420 | PFAS Impacted WRFs: Knowledge Update | In recent years our industry has rapidly gained awareness of the occurrence and challenges associated with per- and polyfluoroalkyl substances (PFAS) in water, wastewater, and wastewater impacted systems. This technical session offers participants an update on alternatives for management of PFAS to below analytical reporting limits in WEF effluents and biosolids, a review of methods used to screen management alternatives and the cost of implementing PFAS treatment solutions, and an update from EPA on the PFAS risk assessment process. | At the end of this session, attendees will be able to (1) discuss PFAS fate and transport in wastewater treatment processes,(2) identify emerging treatment technologies and approaches being developed to manage PFAS in WRFs, and (3) describe updates on environmental impacts of PFAS and risk assessment considerations. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 421 | Novel Applications of QMRA For Sizing Wastewater UV Systems and Identifying Shellfish Harvesting Zones | Presentations will explore the benefits of Quantitative Microbial Risk Assessment (QMRA) to support public health in surface waters receiving treated wastewater. Case studies are presented from New Zealand, which was one of the pioneers of the use of QMRA to determine site-specific UV dose requirements based on microbial risk as opposed to a standard UV dose requirement. Case studies are also presented using QMRA to identify and manage public health risk in shellfish aquaculture and wild shellfish harvesting downstream of discharges from WRFs using chlorine or UV disinfection and various secondary treatment processes. | At the end of this session, attendees will be able to (1) define QMRA and discuss the benefits and limitations of QMRA, (2) discuss New Zealand's unique approach to sizing UV systems based on microbial risks as opposed to a legislated minimum UV dose, and (3) explain the use of QMRA to identify shellfish harvesting exclusion zones. | 1.50 | 10/3/2023 | 3:30 PM | 4:30 PM |
| 422 | Case Studies of Machine Learning in Full-Scale Nutrient Management Part II | The second part of a two session series, this session will present the findings and results of the WRF Project 5121: Development of Innovative Predictive Control Strategies for Nutrient Removal. This second session is focused on presenting three of the full-scale pilot results of the hybrid controller highlighted in the first session known as ODIN (Operational Decision-making Intelligence for Nutrient control). Interactive Session Case Study Analysis | At the end of this session, participants will be able to (1) evaluate the real experience of implementing a Hybrid Controller at a WRRF, (2) calculate the costs and benefits of doing so compared to conventional or pure machine learning approaches, and (3) discuss how has this type of advisory tool been received and accepted by operating staff. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 423 | From Global Best Science to Mitigation of Nitrous Oxide | Global perspectives on the challenges WRRF face when predicting, monitoring, and mitigating N2O emissions will be presented during this session. Featuring perspectives from academia and case studies from the UK, Europe, and New Zealand, this session will include facilitated discussion by industry leaders Julian Sandino and Jose Porro. Interactive Session Facilitated Discussion. | At the end of this session, participants will be able to (1) describe how and why nitrous oxide is produced in biological wastewater treatment plants, (2) recognize best practices for monitoring emissions, and (3) exploring new and explained technology to suppress and treat N2O emissions. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 426 | Design Tools and Technologies for Preliminary and Primary Treatment | Preliminary and primary treatment process design may not be as 'exciting' as advanced biological process design; however, without properly designed preliminary and primary treatment systems, downstream advanced processes are doomed to fail. The design of these processes has traditionally been 'cookbook', based on criteria and approaches long established. However, new and innovative approaches have been developed, and this session presents three technologies or design approaches that improve on traditional methods. Case studies of the technologies will be presented with lessons learned. | At the end of the session, attendees will be able to (1) recognize innovative approaches to design preliminary and primary treatment processes established by presented case studies, (2) identify the potential benefits of these innovative approaches, and (3) apply the lessons-learned from the presented case studies. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 427 | Full-scale Continuous Flow Densification Systems | During this session, participants will gain insights into achieving densification in continuous flow systems using commonly used process configurations, based on recent findings from an ongoing Water Research Foundation Study (WRF 5130) investigating the advancement of densification to implement and achieve more efficient BNR. Presentations will focus on the various studies conducted at full-scale facilities, which developed design criteria that resulted in optimized biological and physical selection. These design criteria will also be translated into operating conditions so that operations crews can successfully implement and maintain a densified activated sludge (DAS) system. From this session, attendees will develop a deep understanding of the industry's current state and key considerations when implementing a DAS system. Interactive Session Knowledge Development Forum. | At the end of this session, participants will be able to (1) identify what to measure for quantifying biological selection effectively and efficiently as an operational tool, (2) discuss the granule fraction and it's significance in maintaining good performance of densified sludge, and (3) describe what densification looks like in non-bioP systems compared more prevalent bioP systems. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 430 | Communications Plans and Actions: Septics, Source Control, and Stakeholders | Information on the development of communications plans used across a variety of diverse stakeholder groups will be presented during this session. Key topics include how to be adaptive in your communications when the project changes, engaging stakeholders on new issues like PFAS source control, and how to develop a communication plan with very diverse stakeholders and issues you may face. | At the end of this session, attendees will be able to (1) compare several successful communication plan development strategies, (2) identify different approaches for successful communication plans based on stakeholder type and audience, and (3) recognize signs that a communications plan needs to 'pivot' to rapidly respond and adjust based on stakeholder feedback during a project. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 431 | Small Community Applications of Decentralization and Associated Management Approaches | Small communities face increasingly challenging requirements associated with management and planning for sustainability, resilience, and reliability. Changes in environmental conditions will necessitate changes to traditional planning and management efforts associated with utility management in small communities. This session will provide examples of the application of small system technology to address emerging wastewater management opportunities in small systems. Interactive Session Facilitated Discussion. | At the end of this session, participants will be able to (1) identify planning approaches to implement sustainable approaches, (2) describe potentials for innovation in the design of small-scale wastewater management systems, and (3) describe mechanisms where environmental conditions influence system design and management. | 1.00 | 10/3/2023 | 3:30 PM | 5:00 PM |

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|----------------|--|---|--|--|-----------|------------|----------|
| 433 | Better Outcomes with CSO Administrative Orders and Consent Degrees | To round out the current discussion on the status of long-term control planning and CSO plans this session will have presentations focusing on re-evaluating, re-opening, and re-negotiating administrative orders and consent decrees to deliver more cost-effective solutions. Program Risk Management and lessons learned from dozens of implemented projects as part of a \$1.5B capital improvements program to reduce CSOs and SSOs will also be discussed during the session. | At the end of this session, attendees will be able to (1) strategize ways to change administrative orders after re-evaluating older plans to deliver more cost effective CSO control solutions, (2) re-evaluate traditional wet weather treatment/storage solutions with the benefits of more up-to-date approaches focused on receiving stream water quality effects, and (3) consider quantitative and qualitative observations from over 10 years of experience on the delivery of a large wastewater program when looking for project or program-level experiences and best practices. | 1.50 | 10/3/2023 | 3:30 PM | 5:00 PM |
| 501 | Intensifying and Optimizing Anaerobic Digestion | Anaerobic digestion has many advantages for WRRFs and is one of the most used technologies for energy recovery. Although the technology has been used for many years, there is still a lot to learn about this process and how best to achieve the most optimum performance. By attending this session, you will learn recent developments in control strategies, including effects of reducing the system SRT and technologies used in enhancing the rate limiting step of hydrolysis. Interactive Session Facilitated Discussion. | At the end of this session, participants will be able to (1) recognize monitoring parameters to diagnose digester health and develop strategies to optimize operations, (2) determine the relationship between detention time and the performance of digestion systems, and (3) compare varying performance of different enhancements to anaerobic digestion facilities. | 1.50 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 502 | Balancing Costs vs. Cleaning: Effective Programmatic Sewer Cleaning Approaches | The Operation and Maintenance of a collection system is expensive and sub-optimal in SSO prevention. Current industry criteria, and therefore regulations, have been accepted based on outdated and unproven assumptions. The session objective is to initiate the development of defensible industry standards for collection system preventive maintenance activities that are customizable for various system sizes and cost effective, while meeting the goal of reducing system failures. Please bring your experience for interactive discussions. | At the end of this session, participants will be able to (1) identify inefficiencies in a utility's area-wide and hot-spot cleaning programs and reduce SSOs in that utility by shifting, not increasing, resources and (2) recognize that current O&M and data management technologies provide further opportunities for optimization of your collection system efforts and can be applied industry-wide. | 1.00 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 503 | Design and Construction Challenges for CSO Control Implementation | The design and construction challenges of implementing combined sewer overflow (CSO) control technologies will be explored during this session. Three presentations will describe the design and construction of three different CSO control technologies: sewer separation, retention/treatment basin (RTB), and tunnel dewatering pump station. This curated session will explore the facets of design and construction and provide, through structured presentations and discussions, details on how to implement different technologies in various conditions, from ultra-urban to suburban. Design considerations to be described include, among other things, private property disconnection, re-use of existing infrastructure, use of drones, tight construction conditions, deep large capacity pump station construction, and maintenance of operations during construction. Additionally, presenters will describe construction costs in challenging labor and supply chain market conditions. Finally, CSO control effectiveness will be described and project costs presented to understand the overall cost-benefit of large-scale CSO control. Interactive Session Case Study Analysis | At the end of this session, participants will be able to (1) identify the fundamental design and construction challenges of large-scale CSO control implementation, (2) describe approaches for integrating various techniques for overcoming construction challenges, (3) identify opportunities for tools such as value engineering to optimize designs and address challenging construction conditions, and (4) describe the costs and benefits of various CSO control technologies in terms of \$/CSO volume controlled. | 1.50 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 504 | UV Disinfection: Where are we? Where are we going? | Wastewater UV disinfection systems have long been dominated by conventional mercury-based lamp systems. LED-based UV systems have the potential to reduce life cycle costs and eliminate the use of mercury in lamps. This session presents a case study on a conventional low-pressure UV system, a comparison of UVC-LED based and low-pressure mercury lamp systems, and a pilot test using dual wavelength UVC-LEDs on wastewater. | At the end of this session, attendees will be able to (1) describe approaches for conventional low-pressure lamp UV systems to meet stringent regulatory requirements, (2) compare low-pressure lamp and UVC-LED based UV systems, and (3) discuss LED UV pilot which implements a dual wavelength approach for wastewater disinfection. | 1.50 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 505 | PdNA Whole Plant Considerations | Partial denitrification anammox (PdNA) research and implementation has primarily focused on nitrogen removal considerations. Integration of PdNA as a whole plant solution requires consideration for overall treatment goals. This session focuses on PdNA implementation as part of a whole plant solution. | At the end of this session, attendees will be able to (1) determine how PdNA can be integrated into whole plant solutions and (2) develop use of native (fermentate) carbon sources to drive PdNA. | 1.50 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 509 | Chemical Phosphorus Removal | The goal of this session is to give insights about chemical phosphorous removal, what the target compounds are, which chemical(s) to choose, where and how to dose, and the impact of chemical phosphorous removal on plant processes such as sludge production and alkalinity consumption. | At the end of this session, attendees will be able to (1) calculate appropriate dose for target phosphorus removal, (2) identify optimum mixing, pH, and alkalinity conditions for efficient phosphorus removal, and (3) predict and quantify the impacts of chemical addition on sludge production and alkalinity consumption. | 1.50 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 510 | Re-direct Carbon for Better Use | Carbon in the influent wastewater is valuable! Come learn about the latest in carbon redirection that could help improve your facility's energy recovery and reduce the nutrient loading and oxygen demand of the downstream biological process! | At the end of this session, attendees will be able to (1) describe three different approaches for redirecting carbon from wastewater, (2) recognize design and operational parameters that can influence carbon redirection, and (3) evaluate carbon redirection performance of a process. | 1.50 | 10/4/2023 | 8:30 AM | 10:00 AM |
| 518 | Making Money from Biogas: RNG to RINs | Creating value from biogas generation will be the focus of this session. Topics will include a review of the Electrical RIN updates expected in 2024 and two studies depicting how WRRFs are using biogas for RNG and RIN. Attendees will have the opportunity to interact directly with speakers during discussion breaks held throughout the session. Interactive Session: Facilitated Discussion | At the end of this session, participants will be able to (1) interpret the EPA RFS rulemaking updates, (2) analyze facility biogas generation potential for best use of biogas, and (3) identify criteria to be used for digester gas upgrading technology evaluation. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 519 | Public and Private Rehabilitation Strategies for I/I Reduction | As communities face larger challenges with inflow and infiltration (I/I), creative solutions are necessary in order to reduce program costs, and address both public and private sources of I/I. The session will focus on cost effective solutions to I/I removal and how communities are moving toward private I/I removal to meet reduction goals. | At the end of this session, attendees will be able to (1) identify cost effective solutions to I/I reduction, (2) describe approaches for integrating various techniques for addressing public and private sources of I/I, (3) identify opportunities for tools to reduce program costs for I/I reduction, and (4) describe the costs and benefits of various CSO control technologies in terms of \$/CSO volume controlled. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 520 | BAP Tunnels and Interceptors | Planned repairs on large diameter pipes are challenging while emergency repairs are dangerous. During this session on large diameter tunnel and interceptor projects, we will determine ways to avoid both. Presentations will cover a range of topics, including sediments, odor inspection, maintenance, and construction. | At the end of this session, attendees will be able to (1) discuss Inspection and Maintenance methods on large diameter pipe, (2) determine Odor Control Process in large diameter pipe, and (3) identify Installation and Repair Methods. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 521 | Microplastics Interaction with Pathogens and Other Microconstituents | Recent updates on the risks of microplastics in wastewater and biosolids caused by microplastics acting as a vector for pathogenic microorganisms and by adsorption of organic compounds and other microconstituents will be reviewed during this session. Presentations will also provide an update on EPA's Office of Research and Development efforts to develop methods to identify and quantify microplastics in different environmental matrices. | At the end of this session, attendees will be able to (1) determine interactions between pathogenic microorganisms and microplastics when present in treated wastewater effluent and biosolids, (2) discuss updates from EPA microplastic-related research to develop methods for quantification of microplastics in different environmental media, and (3) identify water quality factors that influence the sorption of microconstituents on microplastics in wastewater, and associated challenges and opportunities. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |

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|----------------|--|--|--|--|-----------|------------|----------|
| 522 | Unlocking Hydrolysis and Internally Stored Carbon Utilization for Nitrogen Removal | The overall objective of this session is to explore the current state of knowledge of hydrolysis mechanisms in activated sludge and utilization of internally stored carbon, for nitrogen removal and have an interactive discussion with the attendees to further the collective understanding of these processes. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) develop a comprehensive understanding of the underlying mechanisms involved in carbon utilization for phosphorus and nitrogen removal, (2) use practical skills for measuring hydrolysis and carbon utilization rates under different environmental conditions using a range of methods, and interpret the data obtained to inform process operations and control, and (3) identify the occurrence of simultaneous nitrification denitrification and utilization of internally stored carbon within wastewater treatment facilities through the application of measurement and data analysis methods. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 526 | Secondary Clarification Advancements | Beginning with an overview of three WRRF's secondary clarifier performance this session will inform the audience of process model optimization and practical field data, highlight the full-scale clarifier improvements using clarifier's floor improvements, and CFD analysis. The last presentation will focus on design considerations for sludge densification to improve secondary clarifier assessment. Presenters may share some questions during the presentation or end of the presentation to the audience to make more activity and engagements. | At the end of this session, attendees will be able to (1) discuss 3 case study presenting practical field data, CFD modelling results and assessment, (2) recognize secondary clarifier mechanical and structural improvements for better settleability, and (3) determine design considerations for secondary clarifier assessment for densification process. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 527 | Healthy As A Horse? Assessing Bio-P Stability | Outside of your favorite modeling software, Biological Phosphorus Removal will have to react to a changing world - changing effluent targets, changing influent conditions, and changing operations. In this session we will review real-world Bio-P performance under a variety of conditions, including ultra-low phosphorus limits, changing influent and supplemental alkalinity sources, and low SRT. | At the end of this session, attendees will be able to (1) assess methods facilities are using to meet target effluent concentrations, (2) apply operational adjustments to improve Bio-P stability, and (3) recognize limitations of Bio-P operations and changes needed to accommodate Bio-P organisms. | 1.00 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 528 | Pushing the Boundaries of Our Biological Models | With new technologies and processes, new modeling techniques are required to describe observations and mechanisms. New biological models can lead to ways of rethinking design considerations and facilitate pushing the industry forward. This session aims to provide participants with a sneak peak at new biological models that challenge current thinking and approaches as well as an opportunity to discuss these innovative approaches with industry experts. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) identify models that describe up and coming biological processes to supplement design and decision making, (2) provide examples of effective modeling approaches for new biological processes, and (3) recognize the limitations of biological models. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 531 | Project Delivery Challenges: Continued Operations and Commissioning | The focus of this session will be the key aspects of project delivery that are often overlooked or unappreciated: operator involvement during design, keeping plants operational during construction, and final commissioning. The session speakers will describe lessons they learned during the process, provide recommendations for operator involvement, and outline crucial success factors so you can immediately apply this knowledge in your own projects. In addition, Construction Manager at Risk (CMAR) will be discussed as a method of project delivery. | At the end of this session, attendees will be able to, (1) identify new ways to involve operations staff during planning, design, and construction phases, (2) assess how to successfully implement CMAR as a project delivery method, and (3) analyze and apply improvements to current projects in the commissioning phase. | 1.00 | 10/4/2023 | 10:30 AM | 11:30 AM |
| 532 | Strategies for Transformational Change, Innovation, and Operational Efficiency | Our industry has seen significant innovation in design tools, operational tools, as well as emerging technologies to improve operational performance. The challenge is how to implement and utilize advances in technology to provide transformational change in your organization. This session will explore strategic approaches to evaluating treatment technologies along with technology tools to promote operations and maintenance input during the design process to increase effectiveness of operations, and how to revolutionize your workflows to achieve more with less. The lessons from this session are aimed at increasing operational effectiveness and efficiencies. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) identify strategies to utilize technology to improve operational efficiencies, (2) explore different ways to transform the way we use technology to gain operational efficiency, and (3) develop a framework to evaluate and implement business strategies to improve operational effectiveness and efficiency. | 1.50 | 10/4/2023 | 10:30 AM | 12:00 PM |
| 601 | Upgrading and Optimizing Thickening and Dewatering | Understanding the intricacies of thickening and dewatering is critical to efficient solids management. Coupled with thickening and dewatering is the need to understand polymers and how polymer addition affects the level of water removal with both processes. The attendees of this session will understand how to make decisions regarding replacement of equipment, learn how process control can improve dewatering, and how to decide which polymer is best suited for a specific sludge type and the effects of proper dosing. Interactive Session Conversations & Input | At the end of this session, participants will be able to (1) discuss the effects of dewatering technology on the quality of biosolids, (2) identify practical recommendations for assessing the process capabilities of thickening equipment that is already in place in order to enhance its performance, and (3) compare technologies to reduce the cost of biosolids management and to ensure a high quality of biosolids for their current and future biosolids management program. | 1.50 | 10/4/2023 | 1:30 PM | 3:00 PM |
| 602 | Conveyance Modeling | Focusing on hydraulic modeling, this session will cover innovative techniques for modeling rainfall infiltration into sewers, how to size storage components for peak wet weather flow management, and using calibrated models to predict near term impact of rainfall on flows and vary operations to minimize overflow potential. Attendees will be encouraged to share their thoughts during facilitated discussion moments held throughout the session. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) describe the pros and cons of different methods of modeling infiltration and understand their impact on I&I reduction predictions, (2) analyze methods for sizing peak wet weather storage, and (3) manage wet weather flows using predictive tools. | 1.50 | 10/4/2023 | 1:30 PM | 3:00 PM |
| 603 | Managing the Third Effluent Part II | The key to identifying odor sources and technologies is to monitor emissions and apply modeling tools to develop a control strategy. This session highlights three communities approaches to the implementation of monitoring and modeling tools to develop wastewater system-wide control strategies. After each presentation, you will have the opportunity to analyze the case study presented to help develop your knowledge. Interactive Session Case Study Analysis | At the end of this session, participants will be able to (1) determine the methods and tools to evaluate odors in wastewater, (2) recognize both wastewater (sewer sulfide modeling) and air (air dispersion modeling) modeling tools that assist with developing odor assessment and control strategies, and (3) critique how three US cities used odor assessment tools to create odor control strategies. | 1.50 | 10/4/2023 | 1:30 PM | 3:00 PM |
| 607 | Conversion of Conventional Activated Sludge to Suboxic (Low DO) Nutrient Removal | Managers, engineers, operators, and maintenance personnel who want to better understand low dissolved oxygen (DO)/suboxic biological nutrient removal (SBNR) operations will benefit from attending this session. Findings from a DOE funded project DE-EE0009509, entitled 'Transforming Aeration Energy in Water Resource Recovery Facilities (WRRFs) through Suboxic Nitrogen Removal (SNR),' which focuses on full-scale technology development as well as pilot- and full-scale demonstration testing will be presented. In this session, we propose providing an extensive overview of existing processes from the national survey and specific case studies, lessons learned from the full- and pilot-scale demonstration testing, and insights into process modeling suboxic systems. Interactive Session Facilitated Discussion | At the end of this session, participants will be able to (1) identify similarities and differences between the various types of low DO and suboxic BNR operation used at facilities in the US as well as the successes, risks and mitigation strategies for suboxic BNR operation, (2) evaluate the successes and limitations of modeling low DO treatment performance of different BNR configurations, and (3) assess results from the first full-scale facility demonstration in the US of suboxic BNR with real-time Model Predictive Aeration Control (MPAC), SRT control, and high-efficiency blower technology. | 1.50 | 10/4/2023 | 1:30 PM | 3:00 PM |

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| 608 | Applying Hydrocyclones for Densification | Case studies of three full-scale applications of hydrocyclones to achieve activated sludge densification will be covered during this session. The case studies include a variety of base plant configurations including conventional activated sludge plants with and without underlying biological selection pressure for densification as well novel application of hydrocyclones to a membrane-aerated biofilm reactor nutrient removal process. The case studies provide insight on potential benefits from densification and gravimetric selective wasting, ranges of densification outcomes with respect to SVI improvements, and how physical selection may be required to achieve densification despite favorable underlying biological selection conditions. Group analysis of the studies by attendees will compare the applications, results, and implications for treatment plant design. Interactive Session Case Study Analysis | At the end of this session, participants will be able to (1) compare different applications of hydrocyclones for activated sludge densification, (2) differentiate applications lacking versus possessing biological selection pressure for densification, and (3) evaluate the range of densification outcomes and associated benefits. | 1.50 | 10/4/2023 | 1:30 PM | 3:00 PM |
| 612 | Collection System Predictive Analysis | The landscape of viable artificial intelligence and machine learning vendors and solutions can be overwhelming for utilities to get their arms around; and even when they do, the speed at which new applications enter the market continues to increase. In this session, specific case studies will be shared that demonstrate how utilities have successfully leveraged innovative technologies and advanced assessment approaches, including the use of artificial intelligence and machine learning techniques, to support data-driven decision making associated with the deployment of predictive operational support elements, the prioritization of sewer collection system/interceptor asset rehabilitation, and the identification of best-fit mitigation solutions to optimize system performance. Interactive Session Case Study Analysis | At the end of this session, participants will be able to (1) compare lessons learned from different deployments of advanced technologies to assess difficult-to-access sewer and manhole assets, (2) assess and balance the cost of deploying advanced technologies with the value of data obtained to support data-driven decision making, and (3) describe an approach to merge advanced data sets (e.g., LiDAR, sonar) with traditional CCTV data sets (e.g., digital video) to prioritize work. | 1.50 | 10/4/2023 | 1:30 PM | 3:00 PM |

