AL/MS WATER
JOINT ANNUAL CONFERENCE

2022 ALABAMA – MISSISSIPPI WATER

JOINT ANNUAL CONFERENCE PROGRAM

April 10-13, 2022
Arthur R. Outlaw Convention Center
Mobile, Alabama

American Water Works Association

Water Environment Federation

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Welcome to the Joint Annual Conference,

BRYSON AGNEW
JCAC, Chair

Time flies when you're having fun! It was a short eight months ago that we were all together in Mobile for the 2021 Joint Annual Conference. 2022 has come fast but promises to be a year to remember. I'd like to thank everyone for participating in this year's conference, and for all of those who have volunteered their time to plan and coordinate this great event. We have an excellent line up of technical papers, vendor exhibits, and social activities scheduled for this year.

It is with great honor that I was able to participate in the planning of this year's Joint Annual Conference. We are fortunate to be a part of a special group of people that bring together water professionals from the great states of Alabama and Mississippi. With the past few years full of travel restrictions and quarantines, it is more important than ever for us to gather around a like-minded, yet diverse group of people to advance our industry's knowledge and issues through education, collaboration, and socialization.

From all of us on the conference planning committee, and the boards of our associations, we thank you for your support and attendance at the Alabama/Mississippi Joint Annual Conference.

MOBILE TECHNICAL SESSIONS

Exhibit Hall – Tuesday, April 12 – 11:00 a.m. to 12:00 p.m.
(Meet at Entrance to Exhibit Hall)

Mobile Sessions will provide one hour of credit for participation. Two groups will be walked around to participating exhibitors for five to ten minute technical discussions regarding exhibitor products. Mobile session participants should meet at the entrance to the exhibit hall closest to the escalators to check-in with the moderators and split into groups. Moderators will lead the groups through the exhibit hall during the mobile session.

**Participants must be present for the entire duration of the Mobile Sessions to receive credit hour.*

SPECIAL THANKS TO OUR WIFI SPONSOR

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LYNN BROADDUS

Ph.D, M.B.A
WEF Representative

Lynn Broaddus, Ph.D, M.B.A. is the 2021-22 immediate past president of the Water Environment Federation (WEF), an international organization of water quality professionals headquartered in Alexandria, Va.

Lynn formed Broadview Collaborative Inc. in 2014 as a platform for advancing sustainable, resilient practices in the water sector. She serves as a strategic adviser and facilitator for private-sector, nonprofit and philanthropic clients throughout North America, and is known for bringing new ways of thinking to the crucial environmental challenges of our day.

Prior work includes leading The Johnson Foundation's environment program from 2008-2014, convening hundreds of leaders to address national water sustainability and resiliency under the umbrella of "Charting New Waters." Earlier she held leadership roles with Milwaukee Riverkeeper®, The Nature Conservancy and NatureServe, and also has experience in energy conservation and teaching. She earned her doctorate from Duke University, her M.B.A. from the University of Wisconsin-Milwaukee, and her bachelor's degree in environmental sciences from the University of Virginia.

Lynn is past chair of River Network's board, and member emerita (past chair) of the University of Wisconsin-Madison's Nelson Institute Board of Visitors. She recently completed three years as a non-resident senior fellow with the Brookings Institution. Lynn is based in Minneapolis.

MELISSA ELLIOTT

Immediate Past-President (2021-2022)
American Water Works Association
AWWA Representative

Melissa Elliott's career is focused on helping water and wastewater utilities tell their stories. She is the Director of Strategic Communication Services at Raftelis where she consults with utilities to provide communication planning, stakeholder engagement and risk communications. Prior to joining Raftelis, Melissa directed public relations departments at two large Colorado utilities – Denver Water and Aurora Water. All that utility experience means she's worked with the public on issues as diverse as drought, water quality, potable reuse, affordability, rate structure change, massive infrastructure projects, and customer assistance programs.

Being AWWA President has given Melissa a new avenue to elevate the conversation about the value of the services utilities provide. As a public relations practitioner working in the highly technical water industry, Melissa makes it her mission to push those around her to stop being so humble about the essential work we do. She says if we want others to understand our challenges, we need to build relationships with the people and communities we serve and talk about the value we provide.

When she's not working with utilities, Melissa makes her home in Denver where she enjoys cooking for friends, planning future travel adventures and spending time in the Colorado sunshine with her husband.

THE H2DUO

Guest Speakers

Stephanie Corso and **Arianne Shipley**, known as the **H2duO**, worked as public educators and communicators for water utilities for ten years. During that time, they were inspired by what's possible when people collaborate and work together towards solving problems. Their successes are measured in their stories that when shared will inspire, instruct, and incite you into action.

SUNDAY, APRIL 10, 2022

TIME	EVENT	LOCATION
6:00 a.m. – 2:00 p.m.	AL/MS Water Fishing Tournament	Causeway
9:00 a.m – 2:00 p.m.	AL/MS Water Golf Tournament	Rock Creek Golf Club
1:00 p.m – 6:00 p.m.	Registration Desk Open	Upper Concourse South (Conference Center)
12:00 p.m. – 4:00 p.m.	Exhibitor Move-In	North/South Exhibit Hall
4:00 p.m. – 5:30 p.m.	Exhibit Hall Happy Hour	North/South Exhibit Hall
4:00 p.m. – 4:30 p.m.	Moderator Meeting	Convention Center Registration Desk
5:00 p.m. - 7:00 p.m.	Collection Systems Committee Social	Fuse Factory – Mobile
6:30 p.m. – 9:30 p.m.	Welcome Events – Various Venues	Royal Street Tavern – The Haberdasher – Veet's
	Women in Water	Royal Street Tavern
	YPs	Veet's – featuring The Hotdoghery Food Truck

MONDAY, APRIL 11, 2022

TIME	EVENT	LOCATION
6:30 a.m. – 8:00 a.m.	Exhibitor Move-In	North/South Exhibit Hall
6:30 a.m. – 8:00 a.m.	Breakfast – Battle House (For Battle House Guests)	Moonlight A
6:30 a.m. – 8:00 a.m.	Breakfast – Riverview (For Riverview Guests)	Bon Secour Bay
7:00 a.m. – 5:00 p.m.	Registration Desk Open	Upper Concourse South (Conference Center)
8:00 a.m. – 9:30 a.m.	Opening Session	East/West Ballroom
9:00 a.m. – 5:00 p.m.	Exhibit Hall Open	North/South Exhibit Hall
9:00 a.m. – 11:00 a.m.	Historic Downtown Mobile Trolley Tour - Spouse Event	Front of Riverview
9:30 a.m. – 10:00 a.m.	AWWA Business Meeting	201 B/C
10:00 a.m. – 11:30 a.m.	Technical Sessions (Tracks 1, 2, 3, 4)	106A, 106B, 107A, 107B
10:00 a.m. – 11:30 a.m.	Technical Sessions (Tracks 5, 6, 7)	201A, 202A, 202B
11:30 a.m.– 1:00 p.m.	Joint Awards Luncheon	East/West Ballroom
11:30 a.m.– 1:00 p.m.	Exhibit Hall Lunch Open to Attendees	Exhibit Hall
1:15 p.m. – 4:15 p.m.	Technical Sessions (Tracks 1, 2, 3, 4)	106A, 106B, 107A, 107B
1:15 p.m. – 4:15 p.m.	Technical Sessions (Tracks 5, 6, 7)	201A, 202A, 202B
2:00 p.m. – 4:00 p.m.	Spouse Glass Art Class	201D
4:15 p.m. – 5:30 p.m.	Exhibit Hall – Happy Hour	Concessions Area of Exhibit Hall
4:30 p.m. – 5:30 p.m.	YP Home Brew Competition	North/South Exhibit Hall
	Dinner On Your Own	

TUESDAY, APRIL 12, 2022

TIME	EVENT	LOCATION
7:00 a.m. – 8:00 a.m.	Breakfast – Grab and Go	North/South Exhibit Hall
7:00 a.m. – 8:00 a.m.	Poster Competition Set Up	Upper Concourse South (Conference Center)
7:30 a.m. – 8:30 a.m.	Women in Water Breakfast with guest speakers The H2duO	Harbor Room – Riverview
7:00 a.m. – 10:30 a.m.	MAWSS Water Plant Tour	Convention Center – Front
7:00 a.m. – 4:00 p.m.	Exhibit Hall Open	North/South Exhibit Hall
7:00 a.m. – 3:30 p.m.	Registration Desk Open	Upper Concourse South (Conference Center)
8:00 a.m. – 10:15 a.m.	Technical Sessions (Tracks 1, 2, 3, 4)	106A, 106B, 107A, 107B
8:00 a.m. – 10:15 a.m.	Technical Sessions (Tracks 5, 6, 7)	201A, 201B/C, 202A, 202B
9:00 a.m. – 11:00 a.m.	Spouse Brunch and Bingo	Crystal Ballroom – Battle House
10:15 a.m. – 11:00 a.m.	Break in Exhibit Hall	North/South Exhibit Hall
10:15 a.m. – 11:00 a.m.	MWEA Annual Business Meeting	201A, 201B
11:00 a.m. – 12:00 p.m.	Technical Sessions (Tracks 1, 2, 3, 4)	106A, 106B, 107A, 107B
11:00 a.m. – 12:00 p.m.	Technical Sessions (Tracks 5, 6, 7)	201A, 202A, 202B
11:00 a.m. – 12:00 p.m.	Mobile Technical Sessions (meet at entrance to Exhibit Hall near escalators)	North/South Exhibit Hall
11:30 a.m. – 12:00 p.m.	Strolling Lunch Open to Exhibitors	Concession Area of Exhibit Hall
12:00 p.m. – 1:15 p.m.	Strolling Lunch in Exhibit Hall (one credit hour)	North/South Exhibit Hall
12:00 p.m. – 1:15 p.m.	AWWA Water Tasting Competition	North/South Exhibit Hall
12:30 p.m. – 1:15 p.m.	Awards/Door Prizes	North/South Exhibit Hall
1:15 p.m. – 3:30 p.m.	Technical Sessions (Tracks 1, 2, 3, 4)	106A, 106B, 107A, 107B
1:15 p.m. – 3:30 p.m.	Technical Sessions (Tracks 5, 6, 7)	201A, 202A, 202B
2:00 p.m. – 4:30 p.m.	AWWA Competitions	North/South Exhibit Hall
2:00 p.m. – 4:30 p.m.	Exhibit Hall Happy Hour & Crumbl Cookie Social	North/South Exhibit Hall
3:30 p.m. – 4:30 p.m.	Poster Competition Judging	Upper Concourse (outside 201B/C)
4:30 p.m.	Exhibit Hall Closes (Exhibitors Must be Out by 10:00 p.m.)	North/South Exhibit Hall
4:30 p.m. – 6:00 p.m.	YPs and Operators Happy Hour/Social	Harbor Room – Riverview
6:00 p.m. – 9:00 p.m.	Dinner Buffet with Casino Night	Bon Secour Bay – Riverview

WEDNESDAY, APRIL 13, 2022

TIME	EVENT	LOCATION
7:00 a.m. – 8:00 a.m.	Breakfast – Grab and Go	Upper Concourse South (Conference Center)
8:00 a.m. – 10:15 a.m.	Regulatory Updates	202A, 202B
10:00 a.m. – 11:30 a.m.	AWEA Board Meeting	Bienville Square – Battle House
11:30 a.m. – 1:00 p.m.	2023 Joint Conference Planning Meeting	Moonlight C, D, & E – Battle House

MONDAY, APRIL 11, 2022

TIME	ROOM 106A		ROOM 106B		ROOM 107A		ROOM 107B		ROOM 202A		ROOM 202B		ROOM 201A, 201 B/C	
	STORMWATER/ BLENDING	PRESENTER	WASTEWATER TREATMENT	PRESENTER	COLLECTION SYSTEM	PRESENTER	DATA MANAGEMENT AND MODELING	PRESENTER	ADVANCED METERING	PRESENTER	WATER OPERATIONS	PRESENTER	ENGINEERING	PRESENTER
10:00 – 10:45	Reducing Flood Frequency with Controlled Release – Flood Mitigation Assessments	Jon Rasmussen/ Flood-Con	Wastewater Treatment Plant Adaptability: Impact of Variable Loadings on Aging Infrastructure	Dustin Till/ Goodwyn Mills Cawood, LLC	Get in my belly: Evaluating and Correcting Sags in Sewers	Kirk Mills and Alex Leslie/ Kimley Horn	Tear Down Those Silos! Improve Project Collaboration and Overcome Asset Management Challenges using GIS Tools	Jeff Jackson/ Allworld Project Management and Meredith Moore/ Neel-Schaffer	Dark Territory: Extending Your Metering System Beyond Billing into Operations	Patrick Williamson/ Badger Meter	Emerald Coast Utilities Authority – Distribution System Operations Analysis	Jackson Corley/Jacobs and Daniel Corliss/ ECUA	Beneficial Use of Dredged Materials to Restore Tidal Wetlands in Upper Mobile Bay: Calculating Natural Capital benefits	Eldon Blancher/ Moffatt & Nichol
10:45 – 11:30	Why Green? Green Infrastructure Applications and Challenges Across the South	Jessica Watts and David Mason/CDM Smith	Biological Process Intensification	Sean Scuras/ Garver	Comprehensive Sewer Rehabilitation Does not Always Require Comprehensive Rehabilitation	Tina Sheikhzeinoddin & Celeste Lachenmyer/ Hazen & Sawyer and Daniel White/ JCESD	Putting the Clues Together – Increasing Data Collection Accuracy to Solve the Hydraulic Model Mystery	Brock Jones/ Kimley-Horn	Machine Learning for Water Main Condition Assessments	Max Hyberger/ Fracta Inc.	Mechanical vs Electrial – The Best Methods of Tank Level Control	Andrew Green/ Mueller Water Products	Status of the Alabama Dam Safety Program – What we Don't Know will Hurt Us	Steve Newton/ TTL
11:30 – 1:15	LUNCH													
	PUMP STATIONS	PRESENTER	WASTEWATER TREATMENT (ALABAMA BLACK BELT)	PRESENTER	COLLECTION SYSTEM	PRESENTER	ASSET MANAGEMENT	PRESENTER	WATER TANKS	PRESENTER	DISTRIBUTION SYSTEM	PRESENTER	LEAD AND COPPER RULE	PRESENTER
1:15 – 2:00	Managing Flushable Wipes In Collection Systems	Mark Hickok/ Duperon Corp.	Centralized Wastewater Treatment in the Alabama Black Belt	Tristan Wilson/ Auburn University	Pressure Pipe Rehab	Chad Andrews/ Aegion – Underground Solutions	Asset Management – Where to Start?	Brian Shelton/ MWWSSB and Dana Raughton/ Jacobs	Tank Mixing solves more than residual consistency – Case studies on DBP and head space temperature reduction.	Lucy Allen/ Kasco	The Total Cost Equation for Pipelines	John Simpson/ McWane Pipe	Best Practices for data science for lead service line replacement	Sheela Lal/ Blue Conduit
2:00 – 2:45	Tunneling Versus Pumping Cost Effectiveness for Handling 45 MGD Lift Station Expansion	Wayne Hunter/ Gresham Smith	"How-To" Guide for Wastewater Management of Rural, Underserved Communities in the Black Belt Region of Alabama: A Resource for Local Stakeholders	Jillian Maxcy-Brown/ University of Alabama	Precision I&I Microdetection Metering	Michelle Harrod/ Dukes Root Control	How to Build a Vertical Asset Management Program for WRFs (that will actually get used)	Daniel White/ JCESD and Bill Hoisington/ Power Engineers	The Evolution of Tank Coating Systems and Implications for Tank Asset Management	Robert Crumbaugh/ Steel Con Coating Systems and Randy Moore/ AWWA Vice President Elect	Future changes to DBP Rule and how the USEPA Water Treatment Plant Simulation Model assists in rule making	Zaid Chowdhury/ Garver	Mining for Lead: Lead and Copper Rule Revision Inventory	Mark Zito/ Trinnex
2:45 – 3:30	Scrap or Start Over to Modify Existing? How Scaled Physical Modeling of a Critical Pump Station Can Provide the Answer	Tim O'Brien/ Gresham Smith	2021 Changes to Alabama's Rules on Onsite Sewage Treatment and Disposal Regarding the Black Belt of Alabama	Rachel Chai/ University of Alabama	Decatur Utilities – Modeling in the Rain	Hatem El-Sayegh/Barge Design Solutions and Jordan Young/Decatur Utilities	Asset Management Decisions with Machine Learning	Jim Fitchett/ Voda Inc.	What to do with Leaning Water Tank	Jason Dearing/ Krebs and Laura Koon/ Alabaster Water Board	St. Andrew Bay 5,400 LF HDD Crossing	Chad Andrews/ Ageion-Underground Solutions	Getting Your Water Distribution System in Compliance with the Revised Lead & Copper Rule	Heath Hardy and Rachel Cohen/HDR
3:30 – 4:15	Eliminate a Wet Well With Direct In-Line Pumping	James Huck/ Industrial Flow Solutions	Wastewater Solutions for Underserved Communities in the Alabama Black Belt: An Update on Activities of the Consortium for Alabama Rural Water and Wastewater Management	Kevin White/ University of South Alabama	Dynamic Capacity Assurance Program Tool with RDII Projection for Future Development	Stephen King/ Hazen and Sawyer	Keeping It SIMPLE – How to Use Risk Based Assessments to Improve Your Asset Management	Trey Tidmore/ Garver	The Role of Smart Tanks in Distribution Water Quality Management	Pete Kyrkos/ UGSI Solutions	Evaluating and Resolving Corrosion and Color Issues in Water Distribution Systems	Caleb Leach/ Krebs Engineering	Developing a Proactive Lead and Copper Rule Public Relations Program	Monica Allen/ MAWSS and Scott Todd/ HDR
4:15 – 5:30	EXHIBIT HALL – HAPPY HOUR													

TUESDAY, APRIL 12, 2022

TIME	ROOM 106A		ROOM 106B		ROOM 107A		ROOM 107B		ROOM 202A		ROOM 202B		ROOM 201A, 201 B/C	
	BIOSOLIDS	PRESENTER	WASTEWATER TREATMENT	PRESENTER	COLLECTION SYSTEM	PRESENTER	CYBERSECURITY	PRESENTER	WATER LOSS	PRESENTER	WATER TREATMENT	PRESENTER	UTILITY CHALLENGES	PRESENTER
8:00 – 8:45	Holistic Solids Master Planning – Developing a Road Map to Your Solids Destination	Wes Cardwell and Rusty Tate/Garver	I am Meeting Permit. Why Should I Consider Ammonia Based Aeration Control	Stephen Daly/ Hach	Extreme SSO Rainfall – How do you know?	Stephen King/ Hazen and Sawyer and Brian Champion/ JCESD	Data Acquisition – Needs, Uses, and Security	Lennette West/Revere Controls	Survey Says: Results of the 2021 AWWA TEC Survey of Governmental Water Loss Policies	Steve Cavanaugh/ Cavanaugh and Associates	Filter Frets and Fixes: Prioritizing Improvements of Aging Filters at a Drinking Water Treatment Plant through Filter Assessment	Stuart Jeffcoat/ HDR	Understanding the Infrastructure Bill and Navigating the Federal Funding Maze	Laura Lee Burkett/ Jacobs Engineering
8:45 – 9:30	Biosolids Master Planning to Navigate an Evolving Regulatory Landscape	Mia Welch and Adrian Flores/Jacobs Engineering Group	Blower Evaluation and Dissolved Oxygen Control at Walnut Creek WRF	Graham Sizemore/ Goodwyn, Mills and Cawood	Designing for Disaster – Swiss Lane Sanitary Sewer	Mike Stickley/ Jacobs and Cedric Hayden/ JCESD and James Ballintine/ American Pipe	The Role of Security in Municipal Wastewater Plant Operation	Kathryn Grimball/ HACH	The Value of Comprehensive Leak Detection: An Innovative approach to Reducing Real Water Loss Oak Ridge, Tennessee	Deryck Freudeman/ Wachs Water Services	Risk and Resilience: a First Hand Account at a Water Treatment Plant	Jonah Taylor/Krebs Engineering	**Room 201 B/C** 30 Ideas in 30 Mins: Communicating Value	Stephanie Corso and Arianne Shipley/Rogue Water Group

TUESDAY, APRIL 12, 2022

TIME	ROOM 106A		ROOM 106B		ROOM 107A		ROOM 107B		ROOM 202A		ROOM 202B		ROOM 201A, 201 B/C	
	BIOSOLIDS	**PRESENTER**	**WASTEWATER TREATMENT**	**PRESENTER**	**COLLECTION SYSTEM**	**PRESENTER**	**CYBERSECURITY**	**PRESENTER**	**WATER LOSS**	**PRESENTER**	**WATER TREATMENT**	**PRESENTER**	**UTILITY CHALLENGES**	**PRESENTER**
9:30 – 10:15	Double your Cake Solids with Elode Technology	Walter Kuehnrich/ Charter Machine Co	How Can You Manage Your Peak Wet Weather Flows with Treatment?	John Dyson/ Aqua-Aerobic Systems, Inc.	Reset of a Capacity Assurance Program: "Pressing the 'Easy' Button?"	Tonny Peters/ Barge Design Solutions and Angie Akos/ Dothan Utilities	Practical Ways to Keep Your SCADA System Secure: An Overview of Cyber-Security Standards, Best Practices, and Technologies	Alan Hudson, VTScada	Combining Smart Metering with Acoustic Leak Detection	Jody Cline/ Kamstrup	Year-Long Evaluation of the Occurrence and Fate of Pharmaceuticals, Personal Care Products, and Endocrine Disrupting Chemicals in an Urban Drinking Water Treatment Plant	Francis Kungu/ Engineering Design Technologies	Growing Your Team During "The Great Resignation"	Bryan Pate/ InSite Engineering, LLC
10:15 – 11:00	**BREAK/EXHIBIT HALL DOOR PRIZES**													
	UTILITY MANAGEMENT	**PRESENTER**	**WASTEWATER TREATMENT**	**PRESENTER**	**WASTEWATER TREATMENT**	**PRESENTER**	**MOBILE TECHNICAL SESSIONS** **EXHIBIT HALL – MEET AT ENTRANCE CLOSEST TO BOTTOM OF ESCALATORS**		**METERING**	**PRESENTER**	**PUMPING SYSTEMS**	**PRESENTER**	**Room 201 B/C** Round Table – Workforce Challenges	**PRESENTER**
11:00 – 11:30	Five Keys to a Successful Master Plan	Evan Tromble/ Garver	Five Star Filter Disk Filter Retrofit for Destin, FL	Ed Moore/ Eschelman Company	Efficient recovery of nutrients from wastewater in bioelectrochemical systems for reuse in agricultural applications – An experimental evaluation of crop growth	Jackson Sauers/ Mississippi State			Retrofitting Old Wells with Flow Metering	Malcolm Lynch/ CC Lynch	Vertical Turbine Pump Construction and Benefits	Ed Dunn/ Trillium Flow Technologies		Moderator: Margaret Tanner/JCESD Panelist: Jeremy Creel/ JCESD, Shane Cook/ City of Huntsville, BWW, Calressia Jonathan Harris/BWW, Calressia Clark/MAWSS
11:30 – 12:00	How to Increase Revenues without Raising Rates	Gary Sanders/ Edmunds GovTech	Aerobic Granular Sludge: U.S. Case Studies	Paula Dorn/ Aqua-Aerobic Systems, Inc.	Socio-technical Barriers to Successful Responsible Management Entities of Decentralized Clustered Wastewater Systems in the Rural Alabama's Black Belt	Amal Bakchan/ University of South Alabama			Monitoring Flow Through A Control Valve With DP Metering	Louis Antos/Cla-Val Company	Universal Automation: Ushering in a New Era of Plug-and-Play Automation	Louis Arone/ Schneider Electric		
12:00 – 1:15	**LUNCH**													
	WASTEWATER OPERATIONS	**PRESENTER**	**WASTEWATER TREATMENT**	**PRESENTER**	**COLLECTION SYSTEM**	**PRESENTER**	**MEMBRANES**	**PRESENTER**	**WATER**	**PRESENTER**	**GROUNDWATER**	**PRESENTER**	**PFAS**	**PRESENTER**
1:15 – 2:00	Lessons Learned From 25 Years Of A Operator	Jeremy Creel/ JCESD	Meeting Ultra-Low Phosphorous Limits with SBR and Filtration Technology: A Case Study of the Rainbow City WWTP	Bryan Pate, InSite Engineering, LLC	Assessed and Addressed Prevents Catastrophic Force Main Failure during the Pandemic	Jimmy Stewart/ Advanced Water/ Wastewater Solutions	Update on Membrane Technologies	John Hughes/ Suez	Material Increases, Supply-Chain Issues and Covid-19	Pete Bredehoeft/ HDR	Groundwater Remediation for a Release of Mercaptan Used as a Natural Gas Odorant	Brad Newton/ McFadden Engineering	PFAS: The Wild Wild West or Is It?	Lindsay Boone/ Enthalpy Analytical
2:00 – 2:45	How the City of Tuscaloosa Integrated a CMOM Protocol to Reduce SSOs	Ron Smith and Chris Meggs/City of Tuscaloosa	Enhanced Biological Phosphorus Removal (EBRP). What You Can and Cannot Control – Best Design Practices	Nick Barczewski/ Ovivo	Injection Grouting to Reduce Flow to WWTP	Wendy Rouleau/ Prime Resins	Advancing Forward Osmosis for Energy-Efficient Wastewater Treatment towards Enhanced Water Reuse	Shiqiang (Nick) Zou/Auburn University	Lessons Learned from Upgrades to a System Wide SCADA System	Nick Freeman/ Jacobs Engineering Group	Groundwater Remediation with In-Situ Electrogenerated Reagent	Eric Jordan/ Aqua Metrology Systems	Addressing PFAS Through Source Water Assessments and Advanced Treatment	Samantha Black/HDR
2:45 – 3:30	Chain of Custody Forms – Documentation to protect you and your plant	Lennette West/ Revere Control Systems	Sequencing Batch Reactor's	James Aitkenhead, Lakeside	Corrosion In Sewer Collections – Causes And Mitigation	Adam McMillian/ The Sherwin Williams Company	Industrial Strength Reuse: Utilizing MBR+RO to reduce water consumption by 70% at a tractor manufacturing facility	Larry Morris/ Kubota Membrane USA Corporation			Groundwater Well Rehabilitation – Condition Assessment and Optimization	Leigh Sexton/ HDR	Got PFAS? Southeastern Utilities tackle PFAS contamination in Drinking Water	Reed Barton/ CDM Smith

WEDNESDAY, APRIL 13, 2022

TIME	ROOM 106A		ROOM 106B	
	REGULATORY UPDATES	**PRESENTER**	**REGULATORY UPDATES**	**PRESENTER**
8:00 – 8:45	MS DEQ Water	TBD	ADEM Water	TBD
8:45 – 9:30	MSDH Wastewater	TBD	ADEM Wastewater	TBD
9:30 – 10:15	MS Drinking Water and Clean Water SRF Updates	Harry Gong – MS State Department of Health	ADEM SRF	TBD
CONFERENCE ENDS				

REDUCING FLOOD FREQUENCY WITH CONTROLLED RELEASE – FLOOD MITIGATION ASSESSMENTS

SPEAKER(S): Jon Rasmussen
SPEAKER ORGANIZATION: Flood-Con LLC
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 106A

ABSTRACT: Connecting climate change to floods can be a tricky endeavor. Not only do myriad weather – and human-related factors play into whether or not a flood occurs, but limited data on the floods of the past make it difficult to measure them against the climate-driven trends of floods today. However, as the IPCC (Intergovernmental Panel on Climate Change) noted in its special report on extremes, it is increasingly clear that climate change "has detectably influenced" several of the water-related variables that contribute to floods, such as rainfall and snowmelt. In other words, while our warming world may not induce floods directly, it exacerbates many of the factors that do. According to the Climate Science Special Report (issued as part of the Fourth National Climate Assessment, which reports on climate change in America), more flooding in the United States is occurring in the Mississippi River Valley, Midwest, and Northeast, while U.S. coastal flooding has doubled in a matter of decades. Conventional methods are applied to reduce flow waters and peak flow. However, these solutions require large areas and are passive; meaning they do not adjust to the intense rains and cloudburst events experienced in the past few years.

Our solution is applying IoT technology with controlled release. Providing controlled release allows the ability to control the peak flow and timing of the peak flow. Conventional methods increase flow with depth, offering no ability to control the timing of the peak flow rate.

Controlled release offers a dynamic solution to flood control by providing an indefinite amount of available release rates regardless of depth, location, or storm. Our abstract will include a case study of IoT controlled release from an existing pond that effectively reduced the peak flow rate by over 50% in comparison to a conventional device.

Benefits include assurance of compliance, unlimited real-time area of study, reduction in land disturbance and pond area, and significant flexibility and cost savings in land development. Our AOS can also be retrofitted into existing detention ponds without expansion. Every AOS site uploads data to our online customer portal for viewing in real-time so our customers know status or rainfall, pond depth, release rates, and the controlling gate from the pond during a storm. Ultimately, our application of IoT to watershed management will combine real-time control with machine learning and weather forecasting.

WASTEWATER TREATMENT PLANT ADAPTABILITY: IMPACT OF VARIABLE LOADINGS ON AGING INFRASTRUCTURE

SPEAKER(S): Dustin Till
SPEAKER ORGANIZATION: Goodwyn Mills Cawood, LLC
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 106B

ABSTRACT: The Lower Valley WWTP is owned by the East Alabama Water, Sewer, and Fire Protection District (EAWSFD) and provides sewer service to the Valley area adjacent to the Chattahoochee River. As textile mills closed, flows, and loads significantly decreased resulting in treatment difficulty due to long retention times in the aeration basin. As effluent quality criteria became more stringent in the Chattahoochee River, changes were needed to the process.

In 2014, GMC designed the modifications to the 1972 facility which repurposed the digester to the aeration basin and the aeration basin to an equalization basin for high flow events. Just as the plant staff began a history of operations with the new process, a large food processing industry decided to construct a facility in Valley in 2019. This industry would significantly increase the flow and loading to the plant, thereby rendering the recently modified process configuration inadequate. Variable loadings from industries can exert a large demand on the wastewater treatment facility or conversely dilute loads presenting difficulties with treatment.

The solution to accommodate the new industry is to upgrade the facility while providing additional capacity for future growth in the service area. The biological treatment process consists of a sequencing batch reactor allowing to better handle variable loads. Due to site constraints, it was important to utilize existing structures to the greatest extent possible. Ancillary components consist of a new headworks with mechanical screens and vortex grit removal, converting the existing aeration basin back to a digester and new belt presses for sludge dewatering.

GET IN MY BELLY: EVALUATING AND CORRECTING SAGS IN SEWERS

SPEAKER(S): Kirk Mills & Alex Leslie
SPEAKER ORGANIZATION: Kimley-Horn
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 107A

ABSTRACT: What is a sag or bellied pipe? And how does this condition impact or limit the performance of a sanitary sewer? Is it more common in old systems that are aging or new systems in rapidly growing areas where new contractors are entering the marketplace and Owners/Engineers are under resourced?

This presentation will address these questions and show how some selected utilities specify a limit to this condition for acceptance.

What causes a sag or belly to form? Several factors can contribute to a sagged pipe. This can range from an engineer

specifying the wrong type of pipe based on the depth and soil conditions; improper bedding/backfill, lack of design or construction phase QA/QC. These are a few examples we have observed or been asked to evaluate and propose corrective action. There are numerous other scenarios.

We will present one case study from multiple perspectives. This will include a review of methods for observation and evaluation of sags, including a couple of low-tech ways to quantify or measure a sagged pipe using CCTV.

We will also review some common corrective action and pitfalls with choosing the wrong one or not addressing the root cause.

TEAR DOWN THOSE SILOS! IMPROVE PROJECT COLLABORATION AND OVERCOME ASSET MANAGEMENT CHALLENGES USING GIS TOOLS

SPEAKER(S): Jeff Jackson
SPEAKER ORGANIZATION: Allworld Project Management, LLC
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 107B
ABSTRACT: Neel-Schaffer and Allworld Project Management, LLC have developed several information management systems to oversee programs such as stormwater and sanitary sewer asset management and maintenance. This presentation will highlight examples of GIS mapping and analysis programs to establish an integrated GIS system to map, inventory, and depict assets and maintenance work. One main goal in these IMS systems is collaboration between companies, departments, key stakeholders, etc. which will result in real-time, visual information for planning and scheduling system maintenance and operations.

It is always a challenge to coordinate disparate data sources and in many cases silos are in place that prevent effective collaboration. Cities often faces challenges managing asset and maintenance workload efficiently with inability to visually locate work orders, the work done, or be able to tie work to assets or other infrastructure data. The GIS systems implemented help leveraged ArcGIS Online to develop an end-to-end solution which provides everyone with the ability to view all ticket locations, assign work, edit statuses, and create reports resulting in significant decrease in time for problem resolutions. This presentation will highlight some of the procedures used to "tear down those silos", including the use of a data dictionary, procurement of ArcGIS software, data entry and collaboration, and various apps and tools used to assist in making all departments more efficient.

DARK TERRITORY: EXTENDING YOUR METERING SYSTEM BEYOND BILLING INTO OPERATIONS

SPEAKER(S): Patrick Williamson
SPEAKER ORGANIZATION: Badger Meter
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 202A
ABSTRACT: The term "Dark Territory" is used by railroad workers to describe portions of the railroad tracks where signals do not exist, and no one knows for sure what is going on. Water operators have similar “Dark Territory” within their water distribution systems because they lack timely and detailed information provided by water metering systems. Traditionally, these systems are purposed for billing and not operations. Times are changing, now with the convergence of technology advancements in metering (i.e., ultrasonic metering), a variety of reading technologies (i.e., cellular AMI), and cloud computing. Metering systems can now acquire more detailed data points (flows, alarms, pressure, temperature, etc.) with ease through modern communication networks and convert this data into useful information and actionable intelligence using powerful computing systems. Having this type of information easily accessible and scalable will have a transformational impact on the operations of the utility from meter reading to maintenance to billing to engineering to customer service. The customer’s service experience with the water utility can be elevated to greater heights than seen before through the use of online portals, smartphone apps, and automated notifications. What was once considered dark can now be turned over to the light."

EMERALD COAST UTILITIES AUTHORITY – DISTRIBUTION SYSTEM OPERATIONS ANALYSIS

SPEAKER(S): Jackson Corley
SPEAKER ORGANIZATION: Jacobs
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 202B
ABSTRACT: Emerald Coast Utilities Authority (ECUA) owns and operates 31 potable wells, 6 elevated storage tanks, 7 ground storage tanks and the associated distribution system that supplies water to ECUA’s customers. The 31 potable wells are distributed throughout the service area. Seventeen well pumps are equipped with a variable frequency drive (VFD), and some are utilized to maintain a certain system pressure in the distribution network at any given time. The localized system pressure and resultant pump performance is dependent upon which wells are providing water to the system. For example, certain wells should not be online at the same time or both well pumps are at risk of experiencing higher head pressure conditions. Common treatment is applied at all wells. In addition, some wells have additional treatment by granular activated carbon (GAC) for additional removal of contaminants. There is a significant cost associated with the electricity, dosing chemicals, and GAC filter maintenance required to provide water

to customers. ECUA operators currently controls the complex by utilizing SCADA to bring pumps online and offline based on a standard operating procedure.

Through the USACE Planning Assistance to States Project partnership agreement, ECUA and Jacobs evaluated performance of the well pumps individually and explored if changes to system operations and decisions made by operators could result in reduced operational costs.

The first aspect of the analysis was to collect historical data and analyze the performance of each production well to determine how efficiently each pump was operating. After the performance of the pump was confirmed, a comprehensive model was developed by utilizing Replica, a Jacobs proprietary digital twins' tool, to model pump operations and linking it ECUA's existing distribution planning model. The comprehensive model allowed for highly customizable control strategies that would not have been possible by solely using the distribution system model. Using the linked model over 6,000 strategically chosen pump operation configurations were run in the model to generate curves that correlated the cost to run the pump per thousand gallons pumped. The cost per thousand gallons curves were used to provide ECUA with a prioritized well operations list. Jacobs conducted several workshops with all water system operators to discuss alternative pump operations and educate operators on the effects that varying pump speed have on pump performance.

BENEFICIAL USE OF DREDGED MATERIALS TO RESTORE TIDAL WETLANDS IN UPPER MOBILE BAY: CALCULATING NATURAL CAPITAL BENEFITS

SPEAKER(S): Eldon Blancher
SPEAKER ORGANIZATION: Moffatt & Nichol
DATE: Monday, April 11
TIME: 10:00-10:45
ROOM: 201A
ABSTRACT: The Upper Mobile Bay Beneficial Use Wetland Creation Site(Planning) Project was recommended by the Gulf Coast Ecosystem Restoration Council (Council) for planning activities as part of the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf States Act (RESTORE Act) Initial Funded Priorities List (FPL). The RESTORE Act FPL used funds from the settlement with Transocean Deepwater Inc. to provide near-term, on-the-ground ecosystem benefits, while also conducting planning activities designed to build a foundation for future success as additional funds become available from other parties.

The intent is to establish a large-scale beneficial use (BU) dredged material placement area to restore approximately 1,200 acres of brackish tidal marsh in northern Mobile Bay. The project is an opportunity to further extend BU activities to habitat restoration and provide valuable ecosystem services to Mobile Bay.

The specific project objectives are to restore estuarine wetlands through the construction of a containment area and placement of dredged material which would improve water quality, provide habitat for living coastal and marine resources, and enhance the economy of the region by providing cost effective placement options of dredged material for the navigation related industries located along the Mobile River.

The project will provide supporting ecosystem services, referred to as Natural Capital which consists of supporting ecological services from primary, secondary, and tertiary ecological production, and the supporting ecosystem services provided from intact tidal marsh habitat. We have provided analyses in the planning phase which has informed engineering design to maximize Natural Capital benefits from the project.

These analyses consist of 1) Developing baseline ecosystem production using EPA's mechanistic food-chain model AQUATOX; 2) Developing habitat and resource equivalency analyses, as implemented by restoration ecologists to look at the gains over the project lifetime; 3) Monetize the net natural capital so a benefit cost ratio (BCR) for the project over its lifetime can be calculated. This process will be detailed during the presentation where we illustrate how the conservative estimate of natural capital gains of 150% was achieved.

WHY GREEN? GREEN INFRASTRUCTURE APPLICATIONS & CHALLENGES ACROSS THE SOUTH

SPEAKER(S): Jessica Watts
SPEAKER ORGANIZATION: CDM Smith
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 106A
ABSTRACT: Green Stormwater Infrastructure (GSI) has been proposed as a solution for different challenges across the country. This presentation will provide examples and lessons learned for GSI for sanitary sewer overflow, water quality, and water quantity challenges for multiple locations across the south, including two case studies:

East Lake Park, Chattanooga, Tennessee

East Lake Park is cited as the first park in Chattanooga, and at the center of the park's rich history is East Lake Pond, which is approximately 1.75 acres in size and is fed by a natural spring. Over time, the pond has been plagued by algae blooms and vegetation overgrowth that have resulted in poor water quality and clarity.

The City of Chattanooga received grant funding from the Lyndhurst Foundation to spearhead improvements within the park. The City contracted with CDM Smith to develop a Water Quality Improvement Plan for Lake Restoration and Green Stormwater Infrastructure.

Following the completion of the plan, CDM Smith worked with the City to develop a set of design plans for the proposed improvements, which included pond dredging, wetland establishment, daylighting of a local spring, and public education opportunities.

Large Scale Distributed GSI, New Orleans, Louisiana

A properly sized and functioning stormwater system is essential to the protection of the public, property, and infrastructure in any metropolitan area. This is especially true in the City of New Orleans, where local topography presents a unique challenge for stormwater management.

The approach to addressing localized flooding in the two city areas was to design a distributed GSI system using public open space and City right-of-way to manage stormwater volumes. The methodology employed to achieve optimal solutions was highly iterative and involved considerable collaboration among engineering, landscape architecture, and public works professionals working as a team.

GSI locations and preliminary water detention capacities were input into SWMM models for each neighborhood area. The facilities with the greatest benefits and fewest potential conflicts were chosen, as well as other pilot projects that could change the paradigm on how the city develops in the future.

Case studies will focus on the challenges of establishing GSI projects in an urban setting, public demand for improvements beyond stated stormwater goals as well as a discuss lessons learned from the design and construction phases.

BIOLOGICAL PROCESS INTENSIFICATION

SPEAKER(S): Sean Scuras
SPEAKER ORGANIZATION: Garver
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 106B
ABSTRACT: Many utilities are seeking to increase their treatment capacity either because of increasing flows and loads or in response to the decrease in capacity that follows conversion to a BNR process. The treatment capacity of biological wastewater treatment processes is directly related to the quantity of biomass in the bioreactors. More biomass provides more treatment capacity. Consequently, capacity can be increased by adding bioreactor volume at the same biomass concentration or by increasing the biomass concentration in the existing bioreactor volume. Because constructing new bioreactor volume is expensive, increasing the biomass concentration is the more attractive option but it is limited by the capacity of the clarifiers to handle the increased MLSS concentration. To solve this problem, several approaches to "process intensification" have been developed. This presentation introduces several "intensification" alternatives, explains their biological and engineering basis, and their respective pros and cons.

The alternatives presented include membrane bioreactors (MBRs), integrated fixed film activated sludge (IFAS), aerobic granular sludge (AGS), mobile organic biofilm (MOB), and membrane aerated bioreactors (MABR). MBR allows greater MLSS because it replaces the clarifier with a membrane. IFAS and MABR add biomass without increasing the MLSS by adding media that grows biofilm but remains in the bioreactor so the clarifier is not affected. AGS and MOB both convert most of the flocculant biomass to larger denser granules that settle rapidly in the clarifier to allow operation at a greatly increased MLSS. MBR and IFAS generally increase energy consumption while MABR decreases energy use due to high oxygen transfer efficiency via the membranes. AGS and MOB are relatively neutral on energy. MBR tends to decrease nutrient removal efficiency, IFAS provides advantages for nitrification, while AGS, MOB, and MABR all improve nutrient removal because they provide multiple environments within the granule or biofilm.

Each "intensification" alternative allows for a significant increase in biomass and therefore treatment capacity without increasing the bioreactor volume or footprint. Some provide other benefits with respect to improved nutrient removal and/or energy efficiency. This presentation will provide a working knowledge of these "intensification" processes and situations where each can be most successful.

COMPREHENSIVE SEWER REHABILITATION DOESN'T ALWAYS REQUIRE COMPREHENSIVE REHABILITATION

SPEAKER(S): Tina Sheikhzeinoddin, Celeste Lachenmyer, & Daniel White
SPEAKER ORGANIZATION: Hazen and Sawyer & JCSED
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 107A
ABSTRACT: Jefferson County, AL owns and operates wastewater collection systems across nine treatment plant basins serving approximately 600,000 people. The County has recently completed an optimization study which involved the evaluation of asset rehabilitation, conveyance infrastructure improvements, and storage facilities to determine the most cost-effective methods of preventing sanitary sewer overflows (SSOs) throughout the system during 2-year design storms. The optimization process evaluated various infiltration and inflow (I/I) reduction percentages to determine the optimal balance between rehabilitation costs and downstream capacity improvement costs. In many instances, asset rehabilitation was selected as the most cost-effective solution to meet the 2-year level of service. As a result, the County has embarked on an extensive Comprehensive Rehabilitation Program for those areas where asset rehabilitation was selected as the recommended remedial measure. To achieve maximum I/I reduction, comprehensive sewer rehabilitation methods being implemented in each target area typically include cured-in-place lining of all sewer mains, cured-in-place lining of a portion of the service laterals (up to the property line), and manhole rehabilitation; however, the condition assessment and flow measurement processes being used to scope these projects has revealed that, in some instances, isolated sewer rehabilitation or "point repairs" is all that is needed to eliminate significant amounts of infiltration or inflow into the system.

Various real-world examples will be presented that demonstrate how careful planning, data review and field review (i.e., iterative flow monitoring, pre-construction mainline CCTV and lateral launching) being performed for the development of full-scale comprehensive rehabilitation projects, benefits owners and contractors and has generated considerable cost and time savings for the County by eliminating RDII in some areas at a fraction of the cost of full comprehensive sewer rehabilitation.

PUTTING THE CLUES TOGETHER – INCREASING DATA COLLECTION ACCURACY TO SOLVE THE HYDRAULIC MODEL MYSTERY

SPEAKER(S): Brock Jones
SPEAKER ORGANIZATION: Kimley-Horn
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 107B
ABSTRACT: Schertz/Seguin Local Government Corporation (SSLGC) is a regional wholesale water supply system serving the San Antonio area, including Schertz, Seguin, Springs Hill Water Supply Corporation (SHWSC), Selma, Universal City, and the San Antonio Water System (SAWS). The existing SSLGC system consists of two well fields, two treatment plants, three pump stations, a surge tank, and over 44 miles of 42-inch, 36-inch, and 30-inch transmission mains for a total existing capacity of approximately 34 MGD. Water demand is projected to increase from approximately 31 MGD to over 37 MGD within the next decade. With demands rapidly increasing, SSLGC sought to complete a detailed hydraulic analysis of the system to better understand existing deficiencies, determine additional capacity provided by proposed infrastructure, and understand phasing of the proposed projects.

To build a representative hydraulic model and answer SSLGC's questions, Kimley-Horn gathered more accurate and reliable data than traditional field testing to eliminate assumptions typically made in hydraulic model development. To verify pump performance, pump performance tests were conducted at eight different operating conditions to generate the actual pump curve. The testing method utilized electronically recorded data at one-second intervals and used traditional handheld instrumentation to verify that the electronic measurements are accurate. The following parameters were gathered to generate the pump curve and additional system parameters: Pump suction pressure – pressure transducer and analog gauge; Pump discharge pressure – pressure transducer and analog gauge; Transmission line or force main pressure – pressure transducer and analog gauge; Flow – Kimley-Horn strap-on meter and 4-20 mA signal from on-site flow meter to verify flow; Pump rotational speed – tachometer.

The quality of model results is contingent on the accuracy and reliability of calibration. By ensuring an accurate calibration, there is a high degree of confidence in the model results and therefore in the project recommendations. Due to the complexity of the SSLGC system and SSLGC's desire to understand the limitations of their system, collecting the most amount of data possible ensured no rock was unturned to determine the constraints of the system. Ultimately, Kimley-Horn recommended approximately $70 million in proposed projects to ensure the SSLGC system would have sufficient capacity to serve future customers.

MACHINE LEARNING FOR WATER MAIN CONDITION ASSESSMENTS

SPEAKER(S): Max Hyberger
SPEAKER ORGANIZATION: Fracta, Inc.
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 202A
ABSTRACT: The presentation will cover Machine Learning as a tool for water main condition assessments. Several topics will be touched on, including an overview of machine learning condition assessment, how it fits into the current condition assessment process, the pros and cons, machine learning condition assessment in action – both locally (AL) and nationally, and an overview of other machine learning technologies in the water industry. Below is an outline of machine learning and will be the basis of the technical portion. Please reach out with any questions.

Machine Learning gives computers the ability to learn without being "programmed". Machine Learning (ML) uses automated and iterative algorithms, to learn about patterns in big data, detect anomalies, and identify a structure that may be new and previously unknown. ML is not statistics and is not rules-based. Machine learning can utilize hundreds of streams of data (climate, environmental, soil, etc.) in order to perform certain predictions and begins to learn patterns that can inform situations where many of the usual data points may not be available creating a new digital revolution in advanced asset management practices. When ML is combined with statistical analysis, it identifies relationships that may otherwise have gone undetected. Water main condition assessment data contains all the necessary components for machine learning in water utilities with years of historical data. Analyzing this data consistently can uncover trends, gain insight on pipeline health, and offer data-driven assessments. Machine learning can also benefit utilities with a limited asset or breakage data by "filling in the gaps."

A Digital Desktop Condition Assessment using ML produces an accurate model using machine learning to predict water main Likelihood of Failure (LoF) scores, direct utility leak detection efforts, better focus preventative maintenance crews, validate capital replacement plans and align master planning efforts. With 90% of water assets being location-based and most water main pipe data in GIS files, the intersection of GIS and ML was inevitable for both analysis and visualization. This new

technology with 20-30% improvement over traditional methods helps utilities make fast, accurate, and cost-efficient decisions associated with water main repair, rehabilitation, and replacement.

MECHANICAL VS. ELECTRICAL – THE BEST METHODS OF TANK LEVEL CONTROL

SPEAKER(S): Andrew Green
SPEAKER ORGANIZATION: Mueller Water Products
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 202B
ABSTRACT: In nearly every distribution system, there is at least one altitude control valve that is designed for controlling tank levels. Unfortunately, these valves are usually sized improperly and have been retrofitted several times in an effort to cause them to function properly. Because of these factors, altitude valves tend to have a poor reputation for not functioning correctly.

There is an ongoing debate of the best ways for a utility to control tank levels through utilization of existing infrastructure. This presentation will discuss the advantages of both hydraulic (mechanical) and electronic control by way of a SCADA system and/or local control panels in order to assist utilities with determining the best method for their system. We need to take into account the level of expertise in-house, available personnel, knowledge of the system, and a number of other factors to find the best solutions moving forward.

Controlling tank levels is critical both for pressure management and for water quality throughout the distribution system. These tanks represent a significant investment and need to be optimized for the utility to realize their benefit to the system. Oftentimes, the solution is less complex (and expensive) than we might think.

STATUS OF THE ALABAMA DAM SAFETY PROGRAM – WHAT WE DON'T KNOW WILL HURT US

SPEAKER(S): Steve Newton
SPEAKER ORGANIZATION: TTL, Inc.
DATE: Monday, April 11
TIME: 10:45-11:30
ROOM: 201A
ABSTRACT: The State of Alabama is the only state in the U.S. that does not have a Dam Safety Program. For that reason, we largely do not know what we do not know as it relates to most of our dams and the potential vulnerability of the general public. With a high sense of urgency, Alabama needs a data-driven, decision-making process for its aging dams including water supply dams. After implementation of an Alabama Dam Safety Program, it will take considerable time for adequate data to be collected to provide information for dam owners and policymakers to get a complete understanding of the overall integrity of the dam infrastructure and downstream property and human life exposures. Dam deficiencies will need to be addressed through engineering assessments and rehabilitation design. For the high hazard dams, time will be needed to perform dam breach/inundation analyses and to prepare and implement Emergency Action Plans and corresponding Emergency Management Agency evacuation plans during which the public continues to be at risk.

MANAGING FLUSHABLE WIPES IN COLLECTION SYSTEMS

SPEAKER(S): Mark Hickok
SPEAKER ORGANIZATION: Duperon Corporation
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 106A
ABSTRACT: With many wastewater collection systems dating back 100 years – with most more than 50 years old – aging infrastructure is being barraged by our modern conveniences. Lift stations, which are often just wet wells with pumps, particularly in remote areas, are being fouled by wipes and other rags and flushables for which our last-century infrastructure was simply not designed. The problem has gotten worse as so-called flushable wipes have gained popularity. While screens for lift stations do exist, the models that are currently available have disadvantages for smaller applications: they are too large to fit into smaller wells and manholes; they do not provide clean and dry screenings; and they have components that require servicing and/or replacing.

A new technology currently in the final stages of development effectively protects pumps and removes debris at the point it enters the collection system. With this new solution, operators no longer have to compromise between manually cleaning clogged pumps or using maintenance-intensive grinders that send debris downstream to re-weave and become problematic again. This new solution to flushable wipes captures and removes rags and other pump-fouling debris while keeping organics in the collection system.

The compact design of the new technology accommodates small lift stations and manhole applications. Created for smaller collection systems with smaller budgets, the new technology has low power requirements and requires minimal maintenance: annual or less frequent servicing and confined space entries are not needed. An extended discharge chute compacts, stores, and transports screenings up to 40 feet vertically without additional augers or mechanics and screenings are completely contained for odor control and aesthetics.

This presentation will consider data where the new technology has been in alpha testing. The city of Saginaw had been experiencing the now-common problem of flushable wipes causing clogging at the lift station. We will explore how the City had been servicing the lift station's clogged pumps two to three times per week in a confined space, manually removing rags from the check valves. After four months of running the new technology, the City of Saginaw has had zero instances of clogged pumps. After 68 days of run time, screenings in the discharge extension chute were nine feet of a total 26-foot capacity.

CENTRALIZED WASTEWATER TREATMENT IN THE ALABAMA BLACK BELT

SPEAKER(S): Tristan Wilson
SPEAKER ORGANIZATION: Auburn University
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 106B
ABSTRACT: The challenges associated with decentralized wastewater treatment in the Black Belt have been documented and are becoming relatively well known. However, there are also seventy-two centralized wastewater treatment facilities in the seventeen Alabama Black Belt counties, serving a population of almost half a million, a significant fraction of the region's population. In addition, these facilities are important sources of septage treatment capacity for the region's decentralized systems. Nine (12.5%) of the facilities dispose of treated wastewater via land application while the other sixty-three (87.5%) discharge to surface water bodies. Common types of treatment facilities include mechanical treatment plants, aerated lagoons, stabilization ponds, and lagoons with spray fields. Although economies of scale are possible with centralized treatment facilities, a noticeable disadvantage of these more complicated treatment systems is that they require experienced operators and maintenance crew. In addition, the cost to maintain the system can be a significant cost depending on the condition of the facility and implemented processes. Thus, a centralized treatment system that does not have adequate staff and cannot be properly maintained can lead to noncompliance violations, significant noncompliance violations, and possible failure of the treatment system. Thus, the functionality and lifespan of centralized facilities in the Black Belt are variable and noncompliance issues are relatively common. The presentation will review the current status of centralized wastewater treatment in the Alabama Black Belt and its potential role in addressing the region's future wastewater challenges.

PRESSURE PIPE REHAB

SPEAKER(S): Chad Andrews
SPEAKER ORGANIZATION: Aegion-Underground Solutions
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 107A
ABSTRACT: There is no silver bullet technology in pressure pipe rehabilitation for water and sewer pipelines. Utilities are looking for innovative ways to improve underground infrastructure, while utilizing both logical and economical solutions. Oftentimes, utilizing existing conduits can be advantageous for rehabilitation by decreasing impacts to businesses and the environment. The presentation will focus on the advantages of various trenchless technologies, including pipe bursting, conventional sliplining, CIPP, compressed-fit liners and fiber reinforced polymers to be utilized in pipeline rehabilitation of sizes from 4" to 120".

ASSET MANAGEMENT – WHERE TO START?

SPEAKER(S): Brian Shelton & Dana Raughton
SPEAKER ORGANIZATION: Montgomery Water Works and Sanitary Sewer Board & Jacobs
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 107B
ABSTRACT: Effective asset management requires attention to all stages of the asset lifecycle. Activities occurring during each stage require cross-functional, team-based collaboration and decision making, including identifying and performing condition assessments of assets. To prepare for the future and better manage the life of its assets, Montgomery Water Works and Sanitary Sewer Board (MWWSSB) evaluated its current Computerized Maintenance Management System (CMMS), compared software alternatives to better organize and streamline work performed against current assets, and then selected a new CMMS to provide a more user-friendly experience for staff and enhance its asset management practice. Asset lists from each facility were also reviewed and refined to retain historical knowledge, and criticality was assigned to subprocesses within the asset hierarchy, which focused the preventative maintenance strategy on the most critical assets, allowing the utility to be more cost effective and build resiliency. This presentation will focus on refining asset registers and assigning criticality to subprocesses to drive maintenance practices to prepare for implementation of a new CMMS.

TANK MIXING SOLVES MORE THAN RESIDUAL CONSISTENCY – CASE STUDIES ON DBP AND HEAD SPACE TEMPERATURE REDUCTION.

SPEAKER(S): Lucy Allen
SPEAKER ORGANIZATION: Kasco
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 202A
ABSTRACT: Tank mixing is a proven method by all leading mixer manufacturers for eliminating chemical and temperature stratification in the stored drinking water. Recent documented studies by a leading mixer supplier reveal that active mixing will also reduce the air temperature inside of a water storage tank by as much as 30 degrees F during the summer months. This temperature reduction occurs by forcing the cooler water from the bottom of the tank to the surface! The rapidly flowing colder water produced from a robust active mixer across the surface directly cools the air above the water. This in turn can help increase the life expectancy of a metal storage tank. Case study showing the head space temperature.

This presentation will also provide the "How We did It Ourselves", case study results conducted by the Indiana Water Company Staff over a 15-month period in determining the benefits

of tank mixing. The goal of this study was to use simple testing techniques to determine if tank mixing really does improve water quality to the customer tap. This presentation will provide information on how to set up a testing protocol. The results of the chemical and temperature stratification testing including disinfection by-product formation inside five different size and shape water storage tanks will be presented.

THE TOTAL COST EQUATION FOR PIPELINES

SPEAKER(S): John Simpson
SPEAKER ORGANIZATION: McWane Ductile
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 202B
ABSTRACT: SCOPE: When Request for Proposals go out to construct a pipeline project, there are a multitude of items that eventually determine the project cost. However, when bid documents are received by the owner or engineer, many times the per foot bid for the pipeline material is all that is considered. The scope of this paper will focus upon "The Total Cost Equation" which looks at other factors which should be evaluated before the bid analysis is finalized.

FINDINGS: When utilizing the "Total Cost Equation" to analyze bid proposals for differing pipeline materials, it has been found the true cost differential between pipeline materials can be much different than the initial per foot bid when taking into account respective factors that are directly related to installation. Using the "Total Cost Equation", one can determine final project costs related to differing materials. This approach has shown the initial per foot cost of the respective materials is many times deceiving, but unfortunately is the sole parameter used by some owners and engineers to select pipeline materials.

CONCLUSIONS: In order to best serve a utility in the selection of pipeline material for a specific project, several if not many factors relating to the successful installation of that pipeline should be considered. Beyond the initial per foot cost of the pipeline material, some other immediate costs exist such as bedding, tapping saddles, line locator wire, corrosion protection and climate mitigation. Additional longer term present worth costs such as energy and life cycle should also be accounted for prior to a final decision on the selection of pipeline material for a particular project.

BEST PRACTICES FOR DATA SCIENCE IN LEAD SERVICE LINE REPLACEMENT

SPEAKER(S): Sheela Lal
SPEAKER ORGANIZATION: BlueConduit
DATE: Monday, April 11
TIME: 1:15-2:00
ROOM: 201A
ABSTRACT: This presentation is designed to provide guidance for water infrastructure decision makers (WIDM) and other invested parties for effective and efficient water service line material identification and remediation. This specification was designed with extensive input from a broad coalition of participants within water infrastructure science. We are aware that every case of Lead Service Line Replacement (LSLR) projects are different; geographic footprint, water infrastructure, historical data, and budgets can range significantly from city to city. The objective is to arrive at a standard sufficient to meet the needs of the widest variety of cities. Additionally, the efficacy of the following procedures has been proven based on the work of Dr. Abertnethy and Dr. Schwartz in the wake of the water crisis in Flint, MI. Recommendations are given in the following areas: Procedural, Data, and General Practices

TUNNELING VERSUS PUMPING COST EFFECTIVENESS FOR HANDLING 45 MGD LIFT STATION EXPANSION

SPEAKER(S): Wayne Hunter
SPEAKER ORGANIZATION: Gresham Smith
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 106A
ABSTRACT: The North Texas Municipal Water District (NTMWD) is a Regional Water, Wastewater, and Solid Waste Services provider to 80 cities and districts lying in 10 counties in north central Texas. NTMWD's service area includes some of the fastest growing cities in the US and NTMWD's service demands are expected to double by year 2050.

One of NTMWD's 25 lift stations, the Buffalo Creek Lift Station (BCLS) and Force Main is rated to convey 30 MGD of wastewater from the cities of Rockwall, Heath, and Forney to the nearby plant for treatment prior to discharge. In 2019, NTMWD confirmed that the BCLS would soon reach capacity and that improvements should accommodate an additional 45 MGD in addition to the existing 30 MGD served by the existing system. NTMWD management established two options for expanding the BCLS: a conventional expansion with a parallel lift station and force main sized for the additional planned 45 MGD, or accommodating the additional 45 MGD, or the full 75 MGD, in a gravity interceptor. NTMWD called on Gresham Smith to evaluate each of the three options to determine the best infrastructure investment option for addressing the required improvements to the BCLS.

Given the complexity of different levels of capital and operations costs for each option and the need to consider multiple infrastructure investment periods for some of the improvements, Gresham Smith conducted a life cycle cost analysis, which required a conceptual design for each alternative. Collectively, projected operational and programmed maintenance costs, costs escalation and equipment replacement costs were defined, concluding with a Net Present Value comparison supported with a risk analysis for each of the three options for a 30-year planning period.

Option three — a new 75 MGD gravity interceptor — was the lowest NPV solution for addressing long-term growth. The team's analysis revealed that option three dramatically reduced future O&M costs and improved O&M access, limited for air relief valves along the existing 10,000 LF, 36-inch diameter force main with

a riverine floodplain. Ultimately called the Buffalo Creek Interceptor Tunnel, design was initiated in July 2020 and will increase conveyance capacity of the existing BCLS when complete.

REVIEW OF WASTEWATER MANAGEMENT METHODS UTILIZED IN THE BLACK BELT REGION OF ALABAMA

SPEAKER(S): Jillian Maxcy-Brown
SPEAKER ORGANIZATION: University of Alabama
DATE: Monday, April 11
TIME: 2:00-2:45
ROOM: 106B
ABSTRACT: The Black Belt region stretches throughout Mississippi, Alabama, and Georgia. In Alabama, the region traditionally consists of seventeen counties that rely on both centralized and onsite wastewater treatment systems. There are 72 centralized wastewater treatment plants serving roughly 495,000 residents while the remaining 50,000 residents are responsible for installing and maintaining their own onsite wastewater treatment systems. Of the centralized treatment plants, 63 facilities have surface water discharge permits and 9 facilities have land application permits. The residents using onsite systems predominantly use conventional septic tank systems with traditional or mound drainfields (or leachfield). The shrink-swell clays that are the most common surface soils throughout this region become practically impermeable when wet which makes a septic tank drainfield unable to operate properly. Many households are unable to afford alternative, advanced onsite treatment systems and resort to surface discharging raw wastewater into nearby trenches, forested areas, or other surfaces which is a practice known as straight piping. Three Black Belt counties have been the focus of previous wastewater treatment needs studies. A study in Lowndes County found that 13.1% of homes with septic tanks experience problems and 190 homes had straight pipes. A survey of a representative sample of unsewered homes in Wilcox County found only 7% had permitted systems, 60% had straight pipes visible on inspection and 33% had an unpermitted system, but no visible straight pipe. A concurrent survey of a representative sample of unsewered homes in Hale County found that 35% had permitted systems, 6% had visible straight pipes and 59% had an unpermitted system, but no visible straight pipe. These conditions have resulted in the presence of raw wastewater on the ground surface at many rural homes. This is an unacceptable public health issue in a broad region of Alabama. This presentation gives a comprehensive review of the wastewater treatment techniques used in each county of the Black Belt in order to provide the data needed to address this region's wastewater infrastructure needs.

PRECISION I&I MICRODETECTION METERING

SPEAKER(S): Michelle Harrod
SPEAKER ORGANIZATION: Duke's Root Control, Inc.
DATE: Monday, April 11
TIME: 2:00-2:45
ROOM: 107A
ABSTRACT: Collection System microdetection metering has quickly evolved into a quick, effective, and strategic way to pinpoint and record inflow and infiltration that exists in low flow collection system lines, where traditional area velocity metering cannot work effectively. Used in conjunction or as an alternate to large basin monitoring, this technology works extremely well in upstream minimal flow systems. When paired with additional technologies, microdetection metering is capable of isolating pipelines in the system contributing RDII (rain derived I&I flow) or identifying hydraulic and O&M issues reducing capacity or causing backups. This presentation will discuss the technology principles, application, and methods of reporting to take decisive action of building an I&I remediation plan for your utility. Local case study in Anniston, AL and Daphne, AL will be shared in this presentation.

HOW TO BUILD A VERTICAL ASSET MANAGEMENT PROGRAM FOR WRFS (THAT WILL ACTUALLY GET USED)

SPEAKER(S): Daniel White & Bill Hoisington
SPEAKER ORGANIZATION: Jefferson County Environmental Services & Power Engineers
DATE: Monday, April 11
TIME: 2:00-2:45
ROOM: 107B
ABSTRACT: A case study on developing a vertical asset management program for Jefferson County Environmental Services Department's water resource facilities and lift stations. The Jefferson County Environmental Services Department has undertaken the development of a program to develop the following: Deployment of mobile service request, work order and inspection functionality for the water reclamation facilities; Design and develop GIS database to support water reclamation facilities business processes; Migrate historical work order data from Infor EAM software to Cityworks; Deploy an integration between SCADA and Cityworks; Inspect WRF assets and assign a condition rating; Determine document management requirements for O&M manuals; Develop risk profiles for WWTP assets; Review and develop best practices for work management.

THE EVOLUTION OF TANK COATING SYSTEMS AND IMPLICATIONS FOR TANK ASSET MANAGEMENT

SPEAKER(S): Robert Crumbaugh & Randy Moore
SPEAKER ORGANIZATION: SteelCon Coating Systems & AWWA
DATE: Monday, April 11
TIME: 2:00-2:45
ROOM: 202A
ABSTRACT: This presentation will cover the evolution of protective coatings used to protect one of a utility's most valuable assets their steel water storage tanks. Over the years the AWWA Standard

D102 "Coating Steel Water Tanks" has evolved and been revised to include the latest technologies of the time. The presentation will review the coatings systems used in the past and explain each of the current systems recommended for both tank interiors and exteriors in the current D102-17. The water sector is currently embracing asset management for all of a utility's assets and desiring sustainable solutions. The presentation will explain how the importance of life cycle costing as part of a tank asset management program and how utilizing a coating system which yields the longest service life possible will result in the lowest life cycle cost and the most sustainable solution. A protocol for the use of accelerated test data and case histories to predict expected useful service life more accurately for the high-performance coating systems listed in the D102-17 will be presented. A review of life cycle costing and what a sustainable solution looks like for coating systems on steel water storage tanks will be included and suggestions on changes utilities should make to their procurement practices and specifications to ensure their purchasing is aligned with their desire for lowest life cycle cost and most sustainable solution. In addition, the presentation will explore upcoming revisions in the NSF Standard 61 standard and the impact that it will have on the municipal tank lining market.

Learning Objectives: Understanding of the history and evolution of the D102 and the current coating systems listed along with relative useful service life expectations; Learn how to interpret accelerated performance testing along with case studies to more accurately estimate useful service life of a coating system in order to calculate an accurate life cycle cost; Learn how application of asset management and life cycle costing of a properly selected coating system will yield the lowest life cycle cost and most sustainable solution for tank maintenance; Learn how to change procurement practices and specifications to be in alignment with asset management best practices and sustainability goals.

FUTURE CHANGES TO DBP RULE AND HOW THE USEPA WATER TREATMENT PLANT SIMULATION MODEL ASSISTS IN RULE MAKING

SPEAKER(S): Zaid Chowdhury
SPEAKER ORGANIZATION: Garver
DATE: Monday, April 11
TIME: 2:00-2:45
ROOM: 202B
ABSTRACT: USEPA will be revising the D/DBP Rule and have conducted stake-holder meetings in 2021. UCMR4 collected data in support of this process. Brominated DBPs, disinfectant residuals, etc. may be a part of the revised rule. USEPA decided to form a national advisory committee to advise them on the construct of the upcoming revisions. This committee will continue to deliberate in 2022 while EPA will continue to consider regulatory alternatives and the use the WTP Simulation Model for this analysis. This model was originally developed and later revised under the guidance of the author. Recent revisions include biological filtration for precursor removal, more accurate predictions of HAA formation, and the incorporation of chlorination within the distribution system.

This presentation will provide an update of the possible changes that the water community could expect in the upcoming rule revisions. The presentation will also provide a brief overview of the history of the model and present a summary of the most recent updates along with how the updated model may be used for the upcoming D/DBP Rule revisions.

MINING FOR LEAD: LEAD AND COPPER RULE REVISION INVENTORY

SPEAKER(S): Mark Zito
SPEAKER ORGANIZATION: Trinnex
DATE: Monday, April 11
TIME: 2:00-2:45
ROOM: 201A
ABSTRACT: The Environmental Protection Agency (EPA) is revising the Lead and Copper Rule (LCR) to better protect children and communities from the risks associated with exposure to lead in drinking water. While lead was banned in 1986, the EPA estimates 6- to 10 million lead service lines are in use across the U.S, representing about 7 percent of all households. The EPA estimates the average cost to replace a line is $4,700, ranging from $1,200 to $12,300 per line for a total of $28-$47 billion. Many utilities lack a comprehensive inventory of the service lines, including the material. While this data typically exists, it is often not collated in a digital system that is searchable and mapped to an individual address. The revisions to the LCR require an inventory of all water system-owned and customer-owned lead service lines. Systems serving more than 50,000 people must make the inventory available online, while smaller systems need to make the inventory publicly available upon request.

This presentation will focus on strategies to develop the inventory using available sources such as GIS data, distribution system record data, lateral cards, work orders, plumbing codes, and meter replacement programs, to name a few. While unknown material is acceptable in the submission, the property owner must be notified annually, and it will count towards replacement targets if the trigger level is exceeded. Reducing the number of unknowns is advantageous to both the utility and the public. In addition to desktop studies, materials verification may also be needed to confirm the material in the ground using methods such as test-pits and inspecting connections entering homes. With the initial inventory due in three years, now is the time for utilities to begin the process of building the inventory and to start developing a program.

SCRAP AND START OVER OR MODIFY EXISTING? HOW SCALED PHYSICAL MODELING OF A CRITICAL PUMP STATION CAN PROVIDE THE ANSWER

SPEAKER(S): Tim O'Brien
SPEAKER ORGANIZATION: Gresham Smith
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 106A
ABSTRACT: The City of Monroe, Louisiana uses Lake Bartholomew as a source of water for their Water Treatment Plant. The lake receives water from Bayou Bartholomew via the Bartholomew Pump Station, which is located on a platform in the bayou and uses two, 250 HP vertical mixed-flow pumps with a 25,000-gpm capacity to transfer raw water.

The bayou's pumps, which were manufactured by Baldwin – Lima-Hamilton Corporation (now owned by Patterson Pump Company), have experienced frequent failures due to inadequate hydraulic conditions. Water elevations were frequently well below the recommendations of the pump manufacturer and Hydraulic Institute Standards, compromising the City's ability to transfer flow and maintain the critical water source's levels.

The City of Monroe engaged Gresham Smith to determine root causes for the premature pump failures, which had already led to excessive pump station rehabilitation in years past. Gresham Smith studied the pump station's configuration, bayou operating levels, and the pumps' submergence, cavitation, and vibration and concluded that the primary cause of the pumps' failures was due to the lack of submergence — data showed that the water surface elevation was below the minimum level by as much as five feet at least 50 percent of the time.

The project team developed alternatives for fixing the pump station: one option involved completely replacing the station — scrap and start over — while the second option called for modifications to the existing station to alleviate the submergence issues, such as lowering the pumps' intake into a new suction trench, incorporating Formed Suction Intakes, and other various alternatives. To identify which option would provide the most value and help the City make a data-driven decision , the team engaged Clemson Engineering Hydraulics to construct and perform a scaled physical model of the existing station.

The results of the scaled physical model concluded that the "scrap and start over" option wasn't needed, and that the City could implement simple, low-cost solutions to greatly enhance and improve the pumps' operation. Using simpler modifications such as low-cost floor vortex cones under the pump intake, new surface vortex lattice structures, and a new vertical pipe between pumps to hydraulically separate the pump intakes from each other, the City could save up to $10M.

2021 CHANGES TO ALABAMA'S RULES ON ONSITE SEWAGE TREATMENT AND DISPOSAL REGARDING THE BLACK BELT OF ALABAMA

SPEAKER(S): Rachel Chai
SPEAKER ORGANIZATION: University of South Alabama
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 106B
ABSTRACT: Wastewater water treatment quite widely across the United States of America, especially in areas such as the Black Belt of Alabama. The Black Belt of Alabama consists of 17 counties and is largely characterized by its rural nature and dark, dense clayey soil. It is estimated that 3.33% of the land area of 11 out of 17 of these counties had access to municipal wastewater services. The percentage of the population, which lack municipal sewer service in these 11 counties range from 37% to 85%. Many of the country's residents live in unincorporated areas with failing onsite wastewater treatments or straight pipes. Much of these failures can be attributed the clayey soil. This soil type is impermeable to water and makes wastewater treatment quite difficult and expensive. Traditional septic tanks and drain fields fail. A field study of 2,000 homes in Bibb County reported signs of raw sewage at the ground surface of 50% of the homes. Due to these issues, the Alabama Department of Public Health will be adapting and changing their regulations for regions with this difficult soil type. Some speculated changes are the allowance for more treatments and disposal options for the residents of the Black Belt of Alabama like allowing for spray irrigation and/or overland flow of treated effluent. Inspiration of these changes come from Texas and Mississippi wastewater treatment and disposal rules. The following presentation will discuss potential or confirmed changes to the rules for onsite sewage treatment and disposal for the Alabama Department of Public Health.

DECATUR UTILITIES – MODELING IN THE RAIN

SPEAKER(S): Hatem El-Sayegh
SPEAKER ORGANIZATION: Barge Design Solutions, Inc.
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 107A
ABSTRACT: Barge performed an evaluation of Decatur Utilities' (DU) wastewater collection system by developing a hydraulic model. The scope of the project consisted of: Reviewing/collecting data of the gravity and pressurized system to develop the model structure; Collecting flow data (via a subconsultant) over a six-month period to develop operational model input and identify inflow and infiltration patterns; Calibrating and validating a model that can ultimately be used by DU on an on-going basis to monitor how their system is performing; Developing a list of recommended improvement projects based on model results

The model was calibrated using data from 25 temporary flow monitors and four rain gauges. Rainfall data were analyzed to isolate dry-weather days and wet-weather days (days with more than 0.5 inches of rainfall within a 24-hour period). The model was created from survey data, GIS data, record drawings, and pump curves. Under dry-weather and wet-weather conditions, the modeled flow, velocity, and depth were compared to observed quantities.

Additional rainfall events were used to validate that the calibrated model results reasonably simulate the observed system response outside the calibration events. The calibrated and validated model was used to evaluate the system performance under existing flow conditions during the additional rainfall event. These results were used to recommend system improvements to alleviate capacity limitations and reduce SSOs. A list of recommended projects was developed and ordered based by priority.

Going forward, the hydraulic model will serve as a tool that allows DU staff to evaluate the capacity of the existing system under dry and wet-weather conditions and identify proposed solutions to improve capacity and abate surcharges and sanitary sewer overflows.

Successful Outcomes: Model is used as basis of capital improvement projects for I/I reduction and capacity upgrades; Decatur Utilities staff have been trained to perform hydraulic modeling.

ASSET MANAGEMENT DECISIONS WITH MACHINE LEARNING

SPEAKER(S): Jim Fitchett
SPEAKER ORGANIZATION: Voda, Inc.
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 107B
ABSTRACT: Utilities face challenges prioritizing capital investment dollars and operations for managing water and wastewater pipes. Traditional methods for selecting pipes for inspection, monitoring, rehabilitation, and replacement include pipe age or history of incidents or failures.

This presentation compares machine learning to these methods for assessing the health of water and wastewater pipes. It will show the value of machine learning to help utilities make science-driven decisions on managing pipes (and even finding lead pipes). Machine learning is three or more times more accurate in assessing pipe health and up to sixty-five times more accurate in identifying problem areas.

Over 900 water pipes fail every day in the U.S., causing water loss, damage, and disruptions that demand immediate attention. Research shows water main breaks have increased 27% in the past six years. The cost is billions for repairs, replacements, and water loss. Cities across the country have been served Consent Decree orders for failing wastewater networks. The EPA estimates that three million Americans become ill from wastewater incidents each year.

Globally, utilities rank water pipe replacements as their highest priority. Many utilities are proactively inspecting, monitoring, and replacing pipes considered at high risk. Unfortunately, millions of dollars are wasted replacing pipes still in relatively good condition. Meanwhile, the frequency of main failures is increasing for most utilities. Utilities need tools to help them make intelligent decisions about which pipes to monitor, repair, or replace, and, importantly, which to leave alone. Digging up a pipe projected to fail but found healthy is a poor use of resources.

Many utilities try to avoid failures by proactively replacing one percent of their pipes every year. They choose the pipes using educated guesses on which ones may fail. The methods used: Prior failure model – if a pipe has failed before, it's likely to break again; Pipe age model – the older the pipe, the higher the risk of failure; Statistical models using key variables and assigned weights; A combination of these approaches.

Utilities try to find the worst 1% and take proactive steps with available resources. They inspect, monitor, repair, or replace the top one percent and use leak detection, condition assessment, or other activities on the next 3 or 4%. Machine learning is a more cost-effective, science-based approach to making informed decisions.

WHAT TO DO WITH A LEANING ELEVATED WATER TANK

SPEAKER(S): Jason Dearing
SPEAKER ORGANIZATION: Krebs Engineering
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 202A
ABSTRACT: A case study on the evaluation of leaning elevated water tank.

An elevated water storage tank within the Alabaster Water Board's Distribution System experienced differential settlement in footing foundations of approximately one foot. The Board had to remove the tank from active service and is undertaking an evaluation to select the most cost-beneficial options to allow the Board to have adequate water supply and storage within a portion of their distribution system in time for peak summer demands. Options include repair of subsurface conditions and tank foundations; demolition of existing tank and construction of new tank; and operational improvements to meet peak demands in the summer of 2022.

ST. ANDREWS BAY 5,400 LF HDD CROSSING

SPEAKER(S): Chad Andrews
SPEAKER ORGANIZATION: Aegion-Underground Solutions
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 202B
ABSTRACT: The Bay County Public Utilities Department supplies wholesale water throughout Bay County as a basic necessity and core essential service to the area. Panama City Beach is one of Bay County's major users supplied by a north feed from Hwy 77 and an eastern feed crossing highway 98 at Hathaway Bridge. In June 2018, the Bay County (Florida) Public Utilities Department approved the construction of a subaqueous water main in the St. Andrews Bay in Panama City. The existing 24-inch Ductile Iron water main that was installed inside the bridge in 2003 and supported by concrete had experienced intermittent leaking. Since the water main supplied water to the eastern part of Panama City Beach, action need to be taken to immediately replace the water main. Bay County selected a Design-Build team led by Marshall Brothers Construction & Engineering, Inc. and nationwide consulting engineer, Dewberry, to design the proposed water main alignment. A new FPVC water main was installed via horizontal directional drilling (HDD). The HDD (performed by the Mears Group) measured 5400 LF reaching a depth of 113 feet. A total of three pipe lengths of 1800 LF each were preassembled using a McElroy T900 and laid out side-by-side. Each of the pipe lengths were fused together during the insertion process with intermediate joints. The pipe was ballasted with water during the pull-in and averaged only 58,000 LBS of pull force over the last ½ mile of the pull. 24" DR 18 FPVC has a recommended pull force of 307K LBS (SF = 2.5). Construction of the project began in early January 2020 and continued through March of the same year.

GETTING YOUR WATER DISTRIBUTION SYSTEM IN COMPLIANCE WITH THE REVISED LEAD & COPPER RULE

SPEAKER(S): Heath Hardy
SPEAKER ORGANIZATION: HDR
DATE: Monday, April 11
TIME: 2:45-3:30
ROOM: 201A
ABSTRACT: In October 2019, the United States Environmental Protection Agency proposed significant revisions to the Lead and Copper Rule (LCR). As a result, HDR has been working with municipalities throughout Alabama to assess their current compliance with the new LCR and then developing customized action plans for each municipality that are designed to bring them into compliance with the new regulations. The plans address gaps in their current procedures that will exist when the LCR is officially implemented in 2022.

Attendees to this presentation will receive a better understanding of how local utilities are implementing LCR action plans with regard to the following topics: Implementing plans to identify the material of utility-owned and customer-owned service lines; conducting pilot tests to evaluate effectiveness of the existing corrosion control treatment program; Creating new water sampling protocols to protect residents, day cares, and schools; Developing strategic communication plans to proactively create accurate and consistent messaging for community stakeholders.

ELIMINATE A WET WELL WITH DIRECT IN-LINE PUMPING

SPEAKER(S): James Huck
SPEAKER ORGANIZATION: Industrial Flow Solutions
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 106A
ABSTRACT: It is a story we hear time and time again, a submersible pump station requiring unclogging and cleaning from a common villain – "Flushable" wipes. But this story has a happy ending as the OverWatch Direct In-line Pumping System provides a solution to the root cause of this troubling issue: the Wet Well. In the City of Austin, TX a 23-story, 320-unit high rise building with a grocery store and restaurant experienced pump station faults from clogged submersible pumps 6 times in two months. With each service, the culprit was the same; "flushable wipes". Their service charges were compounding. Being a residence building, they have no control over the materials their occupant's flush. They mailed multiple notification letters regarding the issue, but there was no improvement. The building management team knew they needed a solution that was robust and hands-free. They selected the OverWatch Direct In-Line Pumping System to solve their problems.

By removing the wet well and lifting influent directly from the gravity invert, FOG and wipes do not have the opportunity to separate and Solidify. Fibrous material is kept in solution, ejecting it as it arrives. Because the influent is also contained, there is no potential for it to become atmospheric, eliminating all concerns for odor and dangerous gases. Also, eliminating the wet well eliminates well maintenance. There is no collection of grease on basin walls or fear of leaching into the adjacent solid or ground water. OverWatch is changing the world one wet well at a time.

WASTEWATER SOLUTIONS FOR UNDERSERVED COMMUNITIES IN THE ALABAMA BLACK BELT: AN UPDATE ON ACTIVITIES OF THE CONSORTIUM FOR ALABAMA RURAL WATER AND WASTEWATER MANAGEMENT

SPEAKER(S): Kevin White
SPEAKER ORGANIZATION: University of South Alabama
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 106B
ABSTRACT: The Alabama Black Belt is a mostly rural, impoverished region with low population density, limited economic development, and rich clay soils that do not infiltrate traditional septic tank effluents. These characteristics have created many wastewater issues including insufficient wastewater infrastructure, failing onsite systems, direct surface discharge of raw wastewater from individual homes, and community health and environmental hazards. The Consortium for Alabama Rural Water and Wastewater Management (CARWW) was formed in 2018 to foster collaboration amongst academic institutions, community organizations, regulatory agencies, professional organizations, and elected officials seeking to resolve the wastewater management problems in the Alabama Black Belt. CARWW is engaged in several projects aimed at improving wastewater management in the region including the Columbia World Projects: Transforming Wastewater Infrastructure in the United States, the U.S. Environmental Protection Agency: Reinventing Rural Wastewater management, the USDA: Technical Assistance and Training for Innovative Regional Wastewater Treatment Solutions, and the Black Belt Unincorporated Wastewater Program. Key activities for these projects include a "How-To" Guide for Wastewater Management in the Black Belt Region of Alabama, a Review Article on the Status of Wastewater in the Alabama Black Belt, a health impact study, the demonstration of decentralized wastewater (cluster) treatment systems, the evaluation of decentralized wastewater funding and management models, and the development of education and outreach strategies and materials for the general public, K-12 schools, and elected officials. The consortium has engaged in an UNLEASH Hack to address sanitation issues in the Alabama Black Belt, which has resulted in continuing efforts in the region. Additionally, CARWW has participated in the DigDeep "Decentralized Wastewater Innovation Cohorts" aimed at sharing ideas for wastewater solutions for underserved communities facing challenges across the U.S. The consortium is also exploring ways for this region to best utilize new funding opportunities through President Biden's Bipartisan Infrastructure Law. Details of these efforts can be found on the consortium website at *http://ruralwastewater.southalabama.edu.*

DYNAMIC CAPACITY ASSURANCE PROGRAM TOOL WITH RDII PROJECTION FOR FUTURE DEVELOPMENT

SPEAKER(S): Stephen King
SPEAKER ORGANIZATION: Hazen and Sawyer
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 107A
ABSTRACT: Jefferson County developed a Capacity Assurance Program (CAP) to ensure that the entire County wastewater system has sufficient capacity to convey and treat all wastewater. It also ensures there is adequate capacity to collect, transmit, and treat additional sewage expected as a result of new development. Additionally, it tracks growth and provides numerical data for near and long-term capital planning. To help the County efficiently manage the program, Hazen and Sawyer has developed a dynamic CAP tool. To differentiate from most similar tools available in the industry, this CAP tool is fully dynamic by running on a SWWM model platform in the back end with user-friendly interface for easy data input and result display.

The following advanced features and benefits from the CAP tool will be discussed in the presentation: Integration with SWMM model for dynamic flow routing including RDII simulation related to new development; User-friendly interface so the users can use the tool without knowing the technical details on hydraulic modeling; Clear documentation of permit approving process from data input to final decision making; A visual display of the hydraulic impact from the new development to the downstream service areas and comparison with different flow scenarios.

This CAP tool also includes a dynamic component for future RDII projection related to the proposed new development. Future RDII projection related to future developments is always challenge due to the uncertainty with future conditions. For Jefferson County, Hazen has implemented a dynamic approach in the hydraulic model with I/I parameters to represent dynamic wet-weather responses from future development for capacity assessments and remedial measures planning. This approach is superior to the traditional static peaking factor approach. In this approach, parameters can be used to predict flow and volume changes for a variety of rainfall events and conditions allowing for improved facility sizing and impact analysis, and parameters can be customized based on development type, phased schedules for large developments, soil condition, etc. We will also present how we verified those dynamic I/I parameters with real data from the Jefferson County system. This dynamic RDII projection is also being incorporated into the CAP tool so the County can use the tool to generate dynamic results from design storms and be better informed in the development planning and approval process.

KEEPING IT SIMPLE – HOW TO USE RISK BASED ASSESSMENTS TO IMPROVE YOUR ASSET MANAGEMENT

SPEAKER(S): Trey Tidmore
SPEAKER ORGANIZATION: Garver
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 107B
ABSTRACT: For a utility, knowing where and when to spend money improving their sewer collection system is a difficult task. Often, funds are limited, and issues continue to occur despite funding challenges. It's also not an option for utilities to wait until assets fail for rehabilitation or replacement, while repairing and replacing assets of low priority can take away valuable funding from other assets. So, identifying a method to address these issues has become a priority of many utilities.

To better manage the condition of their systems and available funds, utilities have looked to incorporate asset management and capital improvements program into their budgets. While some larger utilities have had CIPs for years, smaller utilities have recently noticed that managing their assets allows them to become more proactive and less reactive in system improvements. Using risk based scoring methods such as Likelihood of Failure (LOF) and Consequence of Failure (COF) can provide utilities with a defensible and consistent prioritization mechanism for the planning of replacement and rehabilitation of their assets.

While there is a wide variety of asset management resources available, this presentation will focus on the Water Environment Resource Foundation (WERF) Sustainable Infrastructure Management Program Learning Environment (SIMPLE) tool and its utilization in a wide array of different asset management projects. The SIMPLE tool has been used by utilities of all sizes and can be tailored to individual utilities or project needs.

This presentation will discuss several case studies, such as a system wide sewage lift station assessment project and multiple gravity collection system assessment projects, to show how asset management can be implemented for utilities and projects of all sizes. This will help assist utilities with decision making and funding allocation.

THE ROLE OF SMART TANKS IN DISTRIBUTION WATER QUALITY MANAGEMENT

SPEAKER(S): Pete Kyrkos
SPEAKER ORGANIZATION: UGSI Solutions
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 202A
ABSTRACT: Today, the two most common distribution network violations that water utilities contend with are disinfection by products (DBPs) and violations of the Revised Total Coliform Rule. With the promulgation of the EPA's Stage 1 and Stage 2 Disinfection Byproduct Rules, water treatment operators and utilities scrambled to ensure their treatment plants were in compliance with THM limits and more carefully monitored plant chlorine dosing – or switched to the more persistent (long-lived)

chloramine as a secondary disinfectant – which had a much lower propensity to form THMs. However, chloramine levels remain difficult to maintain in networks due to their unique chemistry and degradation mechanisms.

In systems that remained with free-chlorine disinfection, residual chlorine can react further within the distribution network forming DBPs — both by further reactions with naturally occurring organic matter and with biofilms present in network pipes and tanks. DBP formation rates vary according to the type of disinfectant used, the dose of disinfectant, the concentration of natural organic matter, the time since dosing (i.e., water age) and temperature. So, regardless of care taken at the plant level, DBPs could continue to form in distribution systems.

On the other hand, moving disinfection largely prevents THM formation in distribution networks, but creates another problem for operators due to the natural degradation of chloramines that releases ammonia which in turn becomes a food source for various strains of bacteria that can lead to nitrification. Determining a dosing strategy for a chloramine system is complex due to the dynamic nature of the breakpoint curve.

The emergence of "Smart Tank" design and operations now provides utilities with the ability to utilize water storage tanks as water quality intervention points. Tanks provide the perfect intervention point to solve THM spikes and low disinfectant residuals (chlorine and chloramine), but it all starts with powerful mixing. By revisiting water storage resources as intervention points, overall distribution network treatment can be optimized with the added potential for reducing treatment plant costs as they relate to THM reduction and disinfectant residual levels.

This presentation will examine the under-utilized water storage tank as an asset that can be used to improve distribution water quality with several methodologies.

EVALUATING AND RESOLVING CORROSION AND COLOR ISSUES IN WATER DISTRIBUTION SYSTEMS

SPEAKER(S): Caleb Leach
SPEAKER ORGANIZATION: Krebs Engineering
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 202B
ABSTRACT: Even well-run water distribution systems can experience periodic issues with color and turbidity that result in customer complaints and water quality concerns. The issues can usually be addressed with a relatively simple evaluation of water quality and chemical addition, followed by sampling and adjustments to the corrosion inhibitor and other chemicals being used in the treatment process. Caleb Leach will review three recent examples to show the steps that were taken to identify and resolve corrosion and color issues in water distribution systems.

DEVELOPING A PROACTIVE LEAD AND COPPER RULE PUBLIC RELATIONS PROGRAM

SPEAKER(S): Monica Allen & Scott Todd
SPEAKER ORGANIZATION: Mobile Area Water & Sewer System (MAWSS) & HDR
DATE: Monday, April 11
TIME: 3:30-4:15
ROOM: 201A
ABSTRACT: The Lead and Copper Rule (LCR) was published in 1991 by EPA and was revised in 2007. In 2020, the rule was revised again. The new rule has requirements that will affect utilities in multiple ways, possibly including new testing requirements, treatment requirements, service line identification/replacements as well as public outreach/notification.

The Mobile Area Water and Sewer System (MAWSS) is developing a Public Relations Program that not only complies with the revised rule requirements for "Improving Risk Communications", but also allows diverse groups across the utility to collaborate on establishing and delivering a consistent message to their customers and community regarding protecting public health and addressing aging infrastructure.

The MAWSS approach includes several phases: Gap Analysis to determine tasks required to comply with the revised LCR; Internal Communications Strategy Workshop to identify the organization's vision, risk assessments, internal and external communication processes, protocols, and resources; Communications Plan to identify MAWSS's goals for LCR communications, create a LCR communications strategy, document key audiences and stakeholders and establish key messages; Implementation Phase activities to deliver this message to customers and local community.

HOLISTIC SOLIDS MASTER PLANNING – DEVELOPING A ROAD MAP TO YOUR SOLIDS DESTINATION

SPEAKER(S): Wes Cardwell & Rusty Tate
SPEAKER ORGANIZATION: Garver
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 106A
ABSTRACT: Traditionally, our solids handling facilities have been viewed through a lens of a necessary headache – meaning, solids production is simply inherent to the task of wastewater treatment. Traditional disposal options have allowed most utilities to maintain disposal options that do not require advanced or rigorous treatment processes to produce a high-quality biosolids product. However, as our treatment facilities evolve through new and/or more strict effluent discharge requirements, the role our solids handling facilities play has also begun to transform.

Additionally, this transformation is being driven by an increased emphasis in disposal requirements from both regulatory developments and public pressure, as well as rising disposal costs associated with limiting or no longer accepting wastewater sludge in landfills. It's also driving the need for more intentional evaluations, design and operational practices, and reliance on

"advanced" technologies to ensure our solids handling facilities can meet these expectations going forward. A solids master plan is a useful tool that, when developed with the above considerations in mind, can provide utilities with a roadmap that aligns future treatment requirements with the necessary solutions to meet these requirements.

This presentation will provide a step-wise, holistic approach to completing a solids master plan. More specifically, this presentation will discuss the following steps to develop a comprehensive solids master plan: 1. Development of stakeholder goals and drivers; 2. Assessing the condition and capabilities of the existing facilities; 3. Completion of a gap analysis to identify where improvements are necessary; 4. A market assessment to understand what alternative disposal options and high strength waste sources bay be available; 5. Assessing best available technologies to fill gaps identified in step 3 as well as to capitalize on the findings of step 4; and 6. Development of alternatives and selection of the best path forward.

I AM MEETING PERMIT. WHY SHOULD I CONSIDER AMMONIA BASED AERATION CONTROL?

SPEAKER(S): Stephen Daly
SPEAKER ORGANIZATION: Hach
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 106B
ABSTRACT: In order to maintain aerobic conditions in the activated sludge process it is necessary to maintain an appropriate DO concentration. Excess DO can lead to wasted energy whereas inadequate DO can result in poor treatment. A common cost effective solution to optimize aeration energy is to utilize a DO control system. The operative phrase is appropriate DO concentration. Ammonia as the controlled variable is applied for one of two reasons: (1) to reduce aeration cost, or (2) to reduce peaks in effluent ammonia. There are additional benefits to consider. Aeration limitation may reduce external carbon addition and improve denitrification and biological phosphorus (bi0-P) performance. This presentation will cover the advantages of a variable DO setpoint as well as other process implications and benefits.

EXTREME SSO RAINFALL – HOW DO YOU KNOW?

SPEAKER(S): Stephen King and Brian Champion
SPEAKER ORGANIZATION: Hazen and Sawyer & JCESD
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 107A
ABSTRACT: The County prioritizes SSOs based primarily on the volume and the recurrence interval based on a base line storm event. The storms are also categorizing to determine if the storm event was excessive. Prior to the categorization method described herein, the County relied on the rain data provided at the Birmingham Airport. As rainfall is often sporadic, this method was not justifiable and another, better method was needed. Hazen developed tools and approaches to understand and characterize the storm events triggering the overflows (SSO). This is because not all reported SSOs have the same significance as some are more critical than others.

In this presentation, we will discuss storm duration, intensity, impacts of antecedent moisture condition on SSO prioritization, and introduce tools, and modeling approaches used which helped Hazen incorporate these variables and information to produce a capacity improvement and remedial measures plan to address SSOs more efficiently. The presentation will describe the County's past and current SSO reporting methods and describe the associated challenges that were involved.

There are freely available tools and information if other utilities want to characterize their storm events and identify recurring critical SSOs. They can use their deployed rain gauge or nearby NOAA rain gauge for this purpose. This can be helpful to identify targeted storm size and SSOs related to that storm size as storms larger than a 2-year event are typically considered excessive events. Hazen typically sets a higher priority for SSOs that occur due to 2 year or less storm event. Additionally, Hazen utilized the groundwater model to implement long term continuous simulations to account for the impacts form various antecedent moisture conditions which is recognized as a big challenge for accurate RDII simulation. Most utilities within EPA Region 4 use a 2-year storm event as the baseline condition. For Jefferson County capacity improvement and remedial measures planning, Hazen uses a 2-year design storm with high antecedent moisture conditions to be on the conservative side. In addition, Hazen does typical year rainfall analysis and long term (10 year) continuous hydraulic model simulation to produce remedial measures solutions. Several Hazen remedial measures projects (both proposed and completed) and their effectiveness will also be presented.

DATA ACQUISITION – NEEDS, USES, AND SECURITY

SPEAKER(S): Lennette West
SPEAKER ORGANIZATION: Revere Control Systems
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 107B
ABSTRACT: This presentation will cover what data is, how to get it, how to use it and how to protect it.

This will cover both drinking water and waste water topics. An overview of why data is so important at these plants and all the different types of data and where they can come from. Security has become an integral part of our daily lives, not just at home but at work. This presentation will also cover general data security and give real world examples of when things didn't go securely.

SURVEY SAYS: RESULTS OF THE 2021 AWWA TEC SURVEY OF GOVERNMENTAL WATER LOSS POLICIES

SPEAKER(S): Steve Cavanaugh
SPEAKER ORGANIZATION: Cavanaugh and Associates
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 202A
ABSTRACT: Many US State government and regional agencies have laws and regulations that require or encourage utilities to account for water use and control water losses. However, these policies vary widely between jurisdictions. AWWA's Technical and Education Council (TEC) sponsored the project Governmental Policies for Drinking Water Utility Water Loss Control, which is a partnered effort between water loss industry leaders and AWWA to help improve utility water loss control practices and better shape educational activities promoting the value of water loss control programs.

This presentation will describe the project methodology for conducting interviews with policy and regulatory agencies across the U.S. and Canada, compilation, analysis of and findings from the survey responses, and will suggest follow-up actions. Results of the survey and conclusions derived will be compiled in a project report that will aid in promoting standardization of Non-Revenue Water assessments and management in the water industry and draw comparisons with the findings of a prior survey conducted in 2000. While it is anticipated that a wide range of approaches for NRW assessments will be observed in the agency responses, a path forward for promoting standardized use of the AWWA methodology should be identified by this research project.

FILTER FRETS AND FIXES: PRIORITIZING IMPROVEMENTS OF AGING FILTERS AT A DRINKING WATER TREATMENT PLANT THROUGH FILTER ASSESSMENT

SPEAKER(S): Stuart Jeffcoat
SPEAKER ORGANIZATION: HDR
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 202B
ABSTRACT: Many utilities struggle with the timing for when to embark upon a major filter rehabilitation effort to replace underdrains, repair backwash systems, and replace filter media. Often, utilities observe operational challenges with achieving target finished water turbidity in the filter effluent or observing sand and anthracite in the clearwells, indicating loss of filter media.

This presentation will utilize a proven approach taken from an over 50 year old water treatment plant to illustrate how to evaluate the condition of the existing filters, with specific emphasis on the condition of the filter media and the filter media backwashing process to prioritize filters for needed improvements. The filter assessment approach is divided into three phases: (I) physical observation and media core samples for floc retention and sieve analysis; (II) backwash observation and media bed expansion analysis; and (III) evaluation of the existing underdrains based on the visual observation of the filter media.

In Phase I, media cores are taken in the center and a back corner of each filter. Core samples for floc retention are taken before and after backwashing and then analyzed for turbidity on-site in order to evaluate the backwash sequence. Core samples for sieve analysis are taken after backwashing and analyzed to determine the effective size and uniformity coefficients of the anthracite and sand media. Physical observations are performed to inspect the structural and mechanical condition of the filters and to identify any defects on the media surface.

In Phase II, a backwash is run for each filter in order to observe any abnormalities, such as media carryover into wash water troughs and media boiling. Bed expansion analysis is performed during the backwash using the tube sampler method and the rise rate was measured per AWWA standard procedures.

In Phase III, portions of the underdrains are inspected for structural and equipment-related defects. Each underdrain is observed in two locations, by removal of sections of the media using a plexi-glass box.

The purpose of this presentation will be to illustrate the methods used in each of the three phases before describing the lessons learned in assessing filters assessment to demonstrate how the results can be utilized in prioritizing future improvements based on the conclusions of this assessment.

UNDERSTANDING THE INFRASTRUCTURE BILL AND NAVIGATING THE FEDERAL FUNDING MAZE

SPEAKER(S): Laura Lee Burkett
SPEAKER ORGANIZATION: Jacobs
DATE: Tuesday, April 12
TIME: 8:00-8:45
ROOM: 201A
ABSTRACT: With utilities facing the continual challenge of balancing the need to upgrade, rehabilitate, and repair their infrastructure with the pressure to maintain affordable water and sewer rates, seeking alternative funding sources is a critical need. An avenue to help address this need is to seek support from programs and other sources tied to the federal government. With the passage of the Infrastructure Investment and Jobs Act (IIJA) in addition to existing other programs in place such as SRF, WIFIA, CDBG, etc., the investment by the federal government in the rebuilding, renewing, and resiliency of our country's infrastructure is expected to reach historically high levels. Navigating thru the often confusing and frustrating maze to access this funding will be the primary topic of this presentation. Learning what funds are available, what existing and new programs have been established to administer these funds, how to apply for these funds, and insight into the application processes and deadlines for programs tied to the water and wastewater industry will be discussed.

BIOSOLIDS MASTER PLANNING TO NAVIGATE AN EVOLVING REGULATORY LANDSCAPE

SPEAKER(S): Mia Welch and Adrian Flores
SPEAKER ORGANIZATION: Jacobs Engineering Group
DATE: Tuesday, April 12
TIME: 8:45-9:30
ROOM: 106A
ABSTRACT: Biosolids master planning efforts historically have been needed to accommodate wastewater service area growth and upgrading of existing biosolids management infrastructure which has reached its serviceable life. Markets for resulting biosolids products must be addressed as part of these evaluations. Concern about changing regulations, especially related to emerging contaminants such as Per- and Poly-Fluoroalkyl Substances (PFAS) has necessitated a change in how master planning is done to ensure markets for end products are viable and sustainable into the future.

Master planning efforts no longer can simply develop technical solutions with capacity to manage the expected quantity of solids produced over a 20 or 30 year planning horizon. Plans must be adaptive to allow for the addition of process enhancements to address changing rules and regulations especially related to compounds of emerging concern. Processes with known ability to reduce or eliminate emerging contaminants such as PFAS must be included in biosolids master planning efforts. Engineers, owners, planners, and operators want to know what process enhancements are available to them if and when such triggers occur.

Examples of biosolids master planning approaches and technical solutions which are being developed will be discussed. This presentation will help utility planners, operators, engineers, and administrators understand the nature of the PFAS issue and how these compounds are introduced into wastewater and biosolids. The rapidly changing regulatory landscape will be presented as well as information on technologies currently being used or developed to eliminate PFAS compounds from biosolids products.

BLOWER EVALUATION AND DISSOLVED OXYGEN CONTROL AT WALNUT CREEK WRF

SPEAKER(S): Graham Sizemore
SPEAKER ORGANIZATION: Goodwyn, Mills and Cawood, LLC
DATE: Tuesday, April 12
TIME: 8:45-9:30
ROOM: 106B
ABSTRACT: The Walnut Creek WRF is an 8 MGD CSAS facility with a future 6 MGD MBR facility being designed. GMC was tasked to assess two operational issues of the existing CSAS plant: (1) Existing multi-stage blowers will not run synchronously, i.e., Blower No. 1 will run alone but not with Blower No. 2 or Blower No. 3, and (2)DO is manually adjusted by nine (9) existing butterfly valves to reach the target DO which is challenging. GMC will assess the issues mentioned above and provide a set of potential solutions to address the blower incompatibility issue and provide automatic DO control in the existing aeration basins. The recommended solutions will take into account the future conditions following the ongoing plant expansion where the plant will be operating both the new MBR plant and the existing CSAS plant. GMC must consider the mass balance of the influent loading between the MBR and the CSAS trains to ensure the proposed solutions can adequately provide enough air for future process needs.

DESIGNING FOR DISASTER – SWISS LANE SANITARY SEWER

SPEAKER(S): Mike Stickley, Cedric Hayden, & James Ballintine
SPEAKER ORGANIZATION: Jacobs, JCESD, & American Pipe
DATE: Tuesday, April 12
TIME: 8:45-9:30
ROOM: 107A
ABSTRACT: As part of a unification agreement in the 1990's the Jefferson County Environmental Services Department took responsibility for an 8-inch sanitary sewer located within and parallel to an unnamed tributary to Patton Creek in Hoover, Alabama. In April 2014 an approximate 600 linear foot section of this sewer was severely damaged during a major rain. An emergency repair was implemented to return this sewer to service until such time as an approach could be developed to relocate the sewer from this challenging installation location. The design took into account the storm event and water forces/velocities that lead to the failure when reviewing pipe materials of construction, pipe joint type, anchors and pipe supports to develop a resilient design. On October 7, 2021, a localized storm resulted in rainfall amounts of over 10-inches in a three-hour period within the drainage basin served by the unnamed tributary. This event destroyed two pipe supports and damaged numerous others due to impact from boulders that were mobilized by the storm runoff. The design survived this event and protected the environment. With severe storm events becoming more frequent it is critical that designs consider the potential impacts from these events and incorporate the appropriate materials of construction and installation methods to provide resilient installations to protect the investment and environment.

THE ROLE OF SECURITY IN MUNICIPAL WASTEWATER PLANT OPERATION

SPEAKER(S): Kathryn Grimball
SPEAKER ORGANIZATION: Hach
DATE: Tuesday, April 12
TIME: 8:45-9:30
ROOM: 107B
ABSTRACT: As technology continues to evolve in the world that we live in and operate in today, the role of and the need for security is becoming ever more apparent and popular for exploration, discussion, and implementation. Cyber-attacks are becoming more prevalent which is a cause for much concern, as the potential for process interruption and the subsequent consequences could result in significant harm to our plants and

the communities that we serve not to mention the financial and legal liabilities associated with these attacks.

In this presentation, we will discuss the basics of Information Technology Security, and the role that it plays in preventing unauthorized access to computers, networks, and data, whether intentional or unintentional. Furthermore, we will explore the foundational five key themes that should be considered as you implement your own security protocol at your facilities.

Now is the time to prepare the way for the future… digital solutions are here.

THE VALUE OF COMPREHENSIVE LEAK DETECTION: AN INNOVATIVE APPROACH TO REDUCING REAL WATER LOSS OAK RIDGE, TENNESSEE

SPEAKER(S): Deryck Freudman
SPEAKER ORGANIZATION: Wachs Water Services
DATE: Tuesday, April 12
TIME: 8:45-9:30
ROOM: 202A
ABSTRACT: This presentation is designed for utilities with an interest in developing programs to reduce real water losses from their drinking water distribution systems. We will look at how a comprehensive approach for reducing real water loss can benefit utilities and share lessons learned at Oak Ridge, TN, and the added value from comprehensive leak detection efforts.

Many utilities are faced with the challenges of higher than acceptable Non-Revenue Water and are seeking solutions to reduce it with an acceptable return on investment. NRW, more specifically real water loss, is a challenge and opportunity for water utilities. At the same time, utilities are working to get their asset management programs up to speed. A comprehensive internal and external leak detection approach attacks both targets.

Increasingly, utilities are seeking to reduce NRW to sustainable levels through the implementation of leak detection programs. Scarcity of water resources in many areas of the country has dramatically escalated the importance and cost of real loss. This new and highly effective approach includes the utilization of both internal and external tools and processes that capture asset inventory and condition data while identifying and meaningfully reducing real water loss in distribution systems.

As outlined in the AWWA M36 Water Audits and Loss Control Programs, this solution is a key technique to identify, measure and verify losses. It is also a component to help instill accountability while controlling losses as part of the procedures necessary to conduct a water audit and recover missed revenues. Comprehensive Leak Detection is an important step to implementing a leakage and pressure management program to control real losses and preserve source water resources; Strong water loss control produces will benefit a utility is in multiple ways: Better water resource management through reduced apparent and real water losses to make better use of existing water resources; Revenue optimization and ratepayer equity; Optimizing operations and supply, improved and more reliable data integrity; Reducing the potential for contamination; Increased knowledge of the distribution system, including the location of mains and valves, pressure levels, and demand variations. This helps the utility to respond more quickly to emergencies and reduce the consequences of failure and liability to the municipality; Improved overall asset management.

RISK AND RESILIENCE: A FIRSTHAND ACCOUNT AT A WATER TREATMENT PLANT

SPEAKER(S): Jonah Taylor
SPEAKER ORGANIZATION: Krebs Engineering
DATE: Tuesday, April 12
TIME: 8:45-9:30
ROOM: 202B
ABSTRACT: Construction in and around water treatment facilities carries inherent risks, and unexpected issues frequently occur, but it is relatively rare to experience two major issues on the same construction project. During construction at the Clanton WTP, the new filter bottoms in a gravity sand filter failed during the initial start-up, requiring an investigation into the cause, followed by a time-consuming resolution. Later during construction, a direct hit from a tornado caused a 36-hour power outage and damaged the on-site back-up diesel fuel system at the raw water pump station, resulting in a temporary loss of raw water supply. Jonah Taylor will review the investigation and details surrounding each of these events and will provide a summary of the lessons learned.

DOUBLE YOUR CAKE SOLIDS WITH ELODE TECHNOLOGY

SPEAKER(S): Walter Kuehnrich
SPEAKER ORGANIZATION: Charter Machine Company
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 106A
ABSTRACT: This presentation is about a new look at using electricity to double the cake solids content coming off of any dewatering equipment in order to cut the disposal costs in half. This technology does not use heat or any other fuel, just setting up a DC electric field to realign sludge particles to allow water to drain off and therefore make the already dewatered cake solids much drier.

HOW CAN YOU MANAGE YOUR PEAK WET WEATHER FLOWS WITH TREATMENT?

SPEAKER(S): John Dyson
SPEAKER ORGANIZATION: Aqua-Aerobic Systems, Inc.
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 106B
ABSTRACT: As our climate changes, we are experiencing more intense wet weather events resulting in an increase frequency in peak flow conditions in our collection networks and treatment facilities. These wet weather events are resulting in much

higher instantaneous peak flow conditions and events are lasting for longer durations. These conditions are putting more stress on our treatment facilities to handle a larger range of operating conditions. Our industry has focused for decades on separating combined sewer systems (CSS), repairing sanitary sewer systems (SSS), or building storage to contain the excess volume during events. This work has made some major dents in reducing the discharge of untreated wastewater, but we continue to have untreated wastewater discharges because of climate change and the never ending collection networks repairs needed.

Generally, the first solution has been to build storage for the peak wet weather flow events and feed the stored volumes back to the treatment plant. This solution works in some cases but not in all cases because the volumes to be stored can be very large volumes and not practical for all events.

How can we solve the issue of reducing or eliminate the discharge of untreated wastewater during peak wet weather flow events? The solution is the use of a combination of technologies to manage and control these peak wet weather flows and treat these volumes of wastewater.

What are the technologies available to utilities now for peak wet weather flows? Active flow management in the collection network using advanced monitoring, providing storage in the network; Classic Storage Solutions that as being optimized; Enhanced High Rate Treatment Technologies (EHRT) – Filtration and Clarification

This paper will cover the use of EHRT technologies with a focus on pile cloth media filtration (PCMF) to treat peak wet weather flow: This paper will cover the following items when using EHRT: Use of PCMF for treatment; Application of PCMF within a treatment facility or remote site; Comparison to storage

Effluent Quality with treatment vs storage in long duration events; Meeting permit and regulatory requirements; Pilot studies and ongoing full-scale operating data from installations during wet weather conditions; Impact on the disinfection of wet weather flow; Advantages of treatment for receiving streams; Results of Pilot Testing in Alabama.

RESET OF A CAPACITY ASSURANCE PROGRAM: PRESSING THE EASY BUTTON?

SPEAKER(S): Tonny Peters
SPEAKER ORGANIZATION: Barge Design Solutions, Inc. & Dothan Utilities
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 107A
ABSTRACT: Reset of a Capacity Assurance Program: "Pressing the 'Easy' Button?"

The City of Dothan, Alabama entered into an Administrative Order on Consent (AOC) with the EPA, in 2012 and successfully closed the order in 2020. As part of the AOC, a Capacity Assurance Program (CAP) was required for the management of added and removed connections and the certification of adequate capacity in the City's wastewater collection, transmission, and treatment components. The backbone of the CAP is a calibrated and validated hydraulic dynamic model simulating the system response to the 2-year 24-hour rain event, under which no system overflows should occur before certifying adequate capacity and approving the connection. Model calibration and validation is performed based on data collection from a long-term flow monitoring program. The CAP allows for the certification of a connection in lieu of adequate capacity, providing credit exists in the form of quantified system improvements. The CAP program may be reset from time to time (annually, bi-annually, every five-years), based on considerations that will have to incorporate sound engineering judgement.

The Banking Credit system keeps track of additional capacity that may be claimed as a result of system improvements. Completed maintenance repairs, pipeline improvements, pump station overhauls, etc., calculation protocols may be used to claim a credit in the impacted basin. When the model is recalibrated, completed system improvements are considered part of the modeled performance and the credit banks will be wiped clean.

In combination with the management of added/removed connections, there may be the risk of overestimated credit or promises of available capacity that may have to be revoked. Dothan, like every other municipality, does not want its growth stumped by the capacity of its sewer system. We think we are conservative in estimating credits and the benefits of capital improvement projects, but we never truly know until we recalibrate the model to account for completed improvements and added/removed connections.

This presentation describes the lessons learned in the certification process as well as the tools that are used to calculate and check the CAP. The key to success in managing the CAP is similar to your checking account's columns for debit and credit. Try to budget and stay ahead of the sewer system and push that reset button at the right time.

PRACTICAL WAYS TO KEEP YOUR SCADA SYSTEM SECURE: AN OVERVIEW OF CYBER-SECURITY STANDARDS, BEST PRACTICES, AND TECHNOLOGIES

SPEAKER(S): Alan Hudson
SPEAKER ORGANIZATION: VTScada by Trihedral
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 107B
ABSTRACT: Cyber-security breaches of computer systems are becoming more and more common, and each of these breaches result in massive issues with the safety, privacy, and confidentiality of companies, financial institutions, and ultimately our personal information. Less often, but perhaps more critical and definitely more concerning to our industry, we are seeing municipalities being affected, either by ransom-ware, general hacking, or specific process disruptions. These infiltrations cause massive loss of

data, carry financial implications, and potentially threaten our customers' health and life-safety.

This session will provide brief overview of the situation, some relevant background, and industry standards for cyber-security. We will then reinforce operational best practices with a live demo, introduce some architectural security designs, and talk about remote connectivity scenarios.

Some of the topics discussed will be: General thoughts around cyber-security breaches; Industry standards which provide guidance; Username/Password/Privilege schemes; Security procedures for accessing or leaving a SCADA system; Operational Real Controls; Remote connection security; Secure backups, redundancy, version and event logging; System design considerations and infiltration mitigation.

COMBINING SMART METERING WITH ACOUSTIC LEAK DETECTION

SPEAKER(S): Jody Cline
SPEAKER ORGANIZATION: Kamstrup
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 202A
ABSTRACT: Non-Revenue Water remains one of the water industry's main challenges and up to 31% of the water loss comes from leaks in service connections. Locating these leaks can be like finding a needle in a haystack. Being placed on private property, knowledge about the state of the service connections can be limited. Therefore, leak detection is often based on a combination of trial and error, theoretical models, and simple gut feeling.

To address this specific challenge, Kamstrup teamed up with several utilities to develop and test a new solution combining smart metering with acoustic leak detection. All based on the idea that maybe the ultrasonic signal in the company's intelligent water meters could also be used to locate leakages by monitoring acoustic noise in the adjacent pipes.

The presentation covers Kamstrup's work implementing an acoustic noise logger in a standard water meter and presents results from a field test.

There are some field examples that are shown as well as customer testimonials.

"This leak had probably been going on for a while. The way it was piped, it would have taken a while for the water to surface. It helped us find a leak we wouldn't have looked for.

YEAR-LONG EVALUATION OF THE OCCURRENCE AND FATE OF PHARMACEUTICALS, PERSONAL CARE PRODUCTS, AND ENDOCRINE DISRUPTING CHEMICALS IN AN URBAN DRINKING WATER TREATMENT PLANT

SPEAKER(S): Francis Kungu
SPEAKER ORGANIZATION: Engineering Design Technologies, Inc.
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 202B
ABSTRACT: The occurrence and removal of thirty representative pharmaceutical and personal care products (PPCPs) and endocrine disrupting chemicals (EDCs) in an urban drinking water treatment plant (DWTP) were investigated for a period of one year to evaluate current system's treatment efficacy and assess occurrence of PPCPs and EDCs in finished drinking water. Results showed that the average total PPCPs and EDCs concentration in the surface water source was around 360 ng/L (median concentration = 340 ng/L) with 57% coefficient of variation (CV). The median concentrations of most of the individual PPCPs and EDCs in the surface water were below 15 ng/L except for N,N-diethyltoluamide (DEET) and nonylphenol, which were at 122 and 83 ng/L, respectively. The compounds DEET, nonylphenol, ibuprofen, triclosan, atrazine, tris(2-chloroethyl)-phosphate (TCEP), bisphenol-A, and caffeine (in the order of decreasing median concentration) were among twenty compounds detected at least once in the surface water, while all of the above detected compounds, except two, were also detected in the finished drinking water. The average total PPCPs and EDCs concentration in the finished drinking water was around 98 ng/L (median concentration = 96 ng/L) with 66% CV. The median concentrations of most detected PPCPs and EDCs in drinking water were below 5 ng/L except for DEET and nonylphenol, which were at 12 and 20 ng/L, respectively. There was a strong correlation (r = 0.97) between PPCPs and EDCs' concentrations in the source water and in the drinking water over the one-year study period when data points from two sampling events with unusual removals were excluded. Individual water treatment unit processes showed greater temporal variations of PPCPs and EDCs removal efficiencies than the overall treatment processes. The removal efficiencies also varied greatly among different PPCPs and EDCs. The average removal for total PPCPs and EDCs was 76 ± 18% at the DWTP, with ozonation showing the highest removal efficiency. Based on the similar occurrence and removal trends observed as that of total PPCPs and EDCs in this study, DEET and nonylphenol can be considered as potential indicator compounds for predicting the occurrence and removal of total PPCPs and EDCs in surface water. No strong correlations could be found between total PPCPs and EDCs removal and the removal of suspended solids, turbidity, or organic carbon.

GROWING YOUR TEAM DURING "THE GREAT RESIGNATION"

SPEAKER(S): Bryan Pate
SPEAKER ORGANIZATION: InSite Engineering, LLC
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 201A
ABSTRACT: The battle to recruit and retain team members is ramping up at an unprecedented pace in the engineering and utility industries. As leaders, what can we do to attract new talent and retain what we already have? We will talk about employee engagement, culture versus benefits, and how to transform our businesses to attract and retain the most talented team members.

FIVE KEYS TO A SUCCESSFUL MASTER PLAN

SPEAKER(S): Evan Tromble
SPEAKER ORGANIZATION: Garver
DATE: Tuesday, April 12
TIME: 11:00-11:30
ROOM: 106A
ABSTRACT: Water and wastewater utilities routinely complete system master plans to characterize the system, identify existing and future challenges, and develop proposed operations, maintenance, and infrastructure projects to address those challenges. Unfortunately, many master plans fall short of the ultimate goal, which is to provide a utility with a decision-support framework. What separates successful master plans that serve as trusted planning resources from those that quickly become paper weights, collecting dust on a shelf?

While there is no single, one-size-fits-all solution for every utility, this presentation will discuss five keys to a successful master plan. It will draw examples from both water distribution and wastewater collection system master plans to describe how the following five factors can be used to set your utility up for success on your next master plan:

1. Align Scope and Utility Goals
2. Capture Existing Conditions and Understand Variabilities of System Flows
3. Plan for Additional Services (as necessary)
4. Apply a Range of Evaluation Horizons to Optimize Capital Improvement Planning
5. Tailor Deliverables for Decision-Support

FIVE START FILTER DISK FILTER RETROFIT FOR DESTIN, FL

SPEAKER(S): Ed Moore
SPEAKER ORGANIZATION: The Eshelman Company, Inc.
DATE: Tuesday, April 12
TIME: 11:00-11:30
ROOM: 106B
ABSTRACT: Five Star disk filters offer a unique approach to the proven concept of cloth media filters, using a series of fixed disks to filter effluent. The system is a continuous flow, outside-in design, using banks of individual disks and a rotating suction-based backwash system, all controlled by a local PLC panel.

The disks in a Five Star system do not rotate – only the backwash header rotates on sealed stainless steel swivel joints. The Five Star design provides individual disk discharge and allows any disk to be removed from service without taking the entire system off line. Backwash uses filtered water and suction from a self-priming pump to provide gentle inside/out cleaning which conditions the media fibers. A wide range of disk sizes is available, making retrofits of existing basins easy. Three actuated valves keep operation and maintenance simple.

Filter disks can be removed/installed in minutes, while the rest of the system stays online. Individual disks can be isolated for inspection/removal while the rest remain in service, and the individual discharge from each disk allows easy sampling or testing. The Five Star design generally has a lower HP requirement.

Using multiple separate disks allows the Five Star system to avoid issues relevant to other designs. Head loss is typically 12", and a transducer is used to monitor tank level. Backwashing is automatic, typically less than a minute, and accounts for under 1% of forward flow – one of the lowest water consumption rates for any filter. Backwashing conditions the cloth fibers, quickly returning the system to performance. Five Star filters can also remove phosphorus to levels of less than 0.1 mg/l with chemical addition.

Five Star utilizes 5 and 10 micron media, both Title 22 approved for 10+ and 12+ gallons sq. ft. loading – nearly twice their competitors. Florida DEP has allowed redundancy credit for Five Star installations, saving capital cost where duplicate capacity is required. Five Star normally designs systems for 5-6 gallons/sq. ft. or less applied, providing considerable excess capacity from day one.

Our presentation will also review a 2019 retrofit installation completed for Destin, FL, which continues to function well to this day. Two disk packs rated for 5.5 MGD each replaced two existing 1.0 MGD traveling bridge filters, providing a total installed capacity of 11.1 MGD. Hydraulic limitations of the existing system prevent the new filters from handling higher flows.

EFFICIENT RECOVERY OF NUTRIENTS FROM WASTEWATER IN BIOELECTROCHEMICAL SYSTEMS FOR REUSE IN AGRICULTURAL APPLICATIONS – AN EXPERIMENTAL EVALUATION OF CROP GROWTH

SPEAKER(S): Jackson Sauers
SPEAKER ORGANIZATION: Mississippi State University
DATE: Tuesday, April 12
TIME: 11:00-11:30
ROOM: 107A
ABSTRACT: Agricultural and municipal wastewater sources contain valuable nutrients essential for the growth of plants. Growing demands for food and other agriculture based products require careful recovery and reuse of nutrients to enable sustainable development. In this research, synthetic municipal wastewater (SWW) and synthetic dairy wastewater (DWW) were treated in a bioelectrochemical treatment system (BES)

constructed using natural materials of bentonite, terracotta, and biochar with the aim to capture the nutrients to be purposely utilized for soil amendments to promote crop growth. Soil amendments are one way to increase nutrient availability in the soil and promote plant growth. Most amendments are the waste from either industrial, agricultural, or biological industries. In this study, four types of amendments were investigated to determine their influence on corn growth. The four amendments were biochar amended soil (BS), terracotta amended soil (TS), terracotta - biochar from SWW-BES amended soil (SWWS) and terracotta - biochar from DWW-BES amended soil (DWWS). Each amendment made up of approximately 10 % of the growing medium by volume. A control consisting of regular soil is also used as a reference condition (SS). A total of 60 corn plants were grown with 12 plants for each soil amendment and the control (soil with no amendments). The soil was stressed with three different nutrient loadings of 100% nutrient concentration, 50% nutrient concentration, and 0% nutrient concentrations. Four replicates were used for each condition. The plants received the nutrients once a day for 30 seconds. The experiments were conducted for 37 days at the Soil-Plant-Atmosphere Research Unit at Mississippi State University. The soils were tested for nutrient and texture analysis. The corn plants were analyzed for stem length, leaf surface area, leaf dry weight, stem dry weight, root dry weight, total root length, root surface area, number of root tips, number of forks in the roots, and the number of crosses in the roots. Results from the experimental studies will be discussed in this research presentation.

RETROFITTING OLD WELLS WITH FLOW METERING

SPEAKER(S): Malcolm Lynch
SPEAKER ORGANIZATION: CC Lynch & Associates
DATE: Tuesday, April 12
TIME: 11:00-11:30
ROOM: 202A
ABSTRACT: Advances in Non-Contact Flow Meter Technology offer an excellent solution to achieve accurate flow measurement for well output master metering. Many wells in our area have iron and manganese which cause erroneous data from contact type meters.

This presentation will discuss non-contact area velocity flow meters on the market today. It will introduce the level and velocity measurement techniques used by these meters. These technologies have numerous benefits over wetted sensors, such as low flow capabilities, ease of installation and servicing without confined space entry, and collecting flow data along with diagnostic data to verify the reading quality and accuracy.

However, not all applications can benefit from this technology. This presentation identifies favorable applications and ones to avoid. It also lists site conditions which can limit the effectiveness, whether by compromising general non-contact measurement advantages, or specifically affecting a level or velocity measurement technique.

VERTICAL TURBINE PUMP CONSTRUCTION AND BENEFITS

SPEAKER(S): Ed Dunn
SPEAKER ORGANIZATION: Trillium Flow Technologies
DATE: Tuesday, April 12
TIME: 11:00-11:30
ROOM: 202B
ABSTRACT: Vertical Turbine Pumps (VTP) are one of the most commonly used pumps in the water industry. Backwash, High Service, Well, and just general water pressure boosting are all common applications for a VTP. To understand why they are used more often than other types of water pumps one must first understand basic centrifugal pump hydraulics, the construction features of a VTP, and then why a VTP has greater flexibility than other centrifugal water pumps. This session will cover all of those topics giving any attendee a much better understanding on the benefits of using VTP's for water pumping applications.

To begin our discussion, we will review some basic hydraulics and pump head-capacity curves. We will discuss 'the system', the things around the pump that will affect the pump. We'll see how all centrifugal pumps respond to 'the system'. and discuss how not all points on a pump performance curve are equal. Some points can increase the Mean Time Between Maintenance (MTBM) and others can significantly shorten it.

From there we will get more into the construction of the VTP pump. We will tear down and rebuild a pump (virtually) to familiarize everyone with its construction. We will see what makes its construction unique from other water pumps and discuss how those differences are beneficial. We will discuss its flexibility in adapting to 'the system', both in the method of how it is physically connected and how it responds during operation.

We will conclude our discussion by applying the hydraulics discussion to the construction of VTP pumps. We will look inside a pump while its operating via Computerized Fluid Dynamics analysis and see how operating at different points on a head-capacity curve effect the pump and discuss how the VTP is best suited to handle these changes.

This discussion is applicable to anyone that owns or operates centrifugal water pumps given that the hydraulic discussion is universal to all centrifugal pumps. It will also benefit consultant engineers that are involved in the design of water pump applications. Its goal is to provide all attendees with a better understanding of centrifugal pumps, specifically VTP's, and how 'the system' will affect the pump that is connected to it.

Floway has been manufacturing VTP's in Fresno, CA since 1933 and we look forward to sharing with you some of what we've learned about centrifugal pumps, VTP's, and water pumping over that 80+ years of history.

HOW TO INCREASE REVENUES WITHOUT RAISING RATES

SPEAKER(S): Gary Sanders
SPEAKER ORGANIZATION: Edmunds GovTech
DATE: Tuesday, April 12
TIME: 11:30-12:00
ROOM: 106A
ABSTRACT: Gary Sanders has over 40 years' experience developing and implementing utility billing software and consulting with utilities and municipalities. In this presentation, Gary draws from his experience in working with over 200 utilities and municipalities to examine how utilities can increase revenues without raising rates.

Utilities continually find themselves under pressure to control rate increases. User fees are an often-overlooked source of income to supplement rate revenues. By using data from the biennial Utility Fee Surveys from the last ten years, Gary presents participants with options for fees – some commonly used and others often overlooked – to consider when updating their schedule of fees.

During the presentation, Gary also presents graphics depicting how much other utilities charge for common fees.

AEROBIC GRANULAR SLUDGE: U.S. CASE STUDIES

SPEAKER(S): Paula Dorn
SPEAKER ORGANIZATION: Aqua-Aerobic Systems, Inc.
DATE: Tuesday, April 12
TIME: 11:30-12:00
ROOM: 106B
ABSTRACT: Aerobic Granular Sludge (AGS) technology operates on an optimized batch cycle structure that creates the proper conditions to develop and maintain granules: large, dense microbial aggregates displaying as particles greater than 200 microns in diameter that perform biological nutrient removal and display exemplary settleability relative to conventional activated sludge (CAS). The layered microbial community of these granules enables simultaneous nitrification/denitrification and enhanced biological phosphorus removal to occur within the granular biomass. This technology therefore eliminates the need for clarifiers, carrier media, and return sludge pumping stations, as well as selectors or separate compartments for plants looking to achieve BNR. The enhanced settling properties allow the system to operate at a high MLSS in excess of 8 g/L without a loss in aeration efficiency due to the granular nature of the sludge. The AGS process can therefore provide a significant reduction in footprint requirements and energy demand compared to a conventional technology.

The AGS process has been implemented successfully for the past 15 years with over 90 plants either in operation or under construction globally. Introduced to the North American market in 2017, there are now over 10 plants operating or under construction in the United States. In 2021, three new plants were started up in Colorado, Montana, and Oklahoma. This session will examine each of these plants, including the circumstances that led them to adopt AGS technology and the performance of each plant since startup. In addition, the presentation will provide an update on the Foley, Alabama plant, in operation since January 2020.

SOCIO-TECHNICAL BARRIERS TO SUCCESSFUL RESPONSIBLE MANAGEMENT ENTITIES OF DECENTRALIZED CLUSTERED WASTEWATER SYSTEMS IN THE RURAL ALABAMA'S BLACK BELT

SPEAKER(S): Amal Bakchan
SPEAKER ORGANIZATION: University of South Alabama
DATE: Tuesday, April 12
TIME: 11:30-12:00
ROOM: 107A
ABSTRACT: Over the past few decades, the Black Belt region of Alabama has been struggling from a lack of access to wastewater management. The soil condition (impermeable shrink-swell clays) prevents infiltration of effluent and consequently causes hydraulic failure in conventional septic systems (e.g., septic tank drainfield). While ongoing research efforts are investigating decentralized clustered wastewater systems as promising solutions to the wastewater challenges in these communities, how to best manage these small systems is largely unknown. If improperly managed, decentralized systems do not provide the level of treatment necessary to adequately protect public health and water quality. As such, establishing a responsible management entity (RME) that conducts the operation and maintenance (O&M) can ensure more reliable system performance. As a prerequisite to identifying adequate RMEs, this study (1) explores possible socio-technical barriers — spanning the technical, financial, regulatory/institutional, social, and environmental dimensions — that may hinder RMEs' operations in the Black Belt communities; and (2) provides practical and policy recommendations that could best overcome these barriers. The study is enabled by a survey questionnaire administered to various public and private rural management entities (e.g., public water, sewer, natural gas, and electric utilities; electric cooperatives; solid waste management; and community development corporations). Using descriptive statistics and statistical inferencing, preliminary results indicate that the financial and regulatory/institutional barriers are the most critical issues that the targeted RMEs are concerned about. The "not paying for O&M services" and "difficulty to obtain funds" are highly rated barriers by the respondents. As such, to further support the urgent need for decentralized wastewater management in rural, underserved communities, federal and state policy needs to address gaps in these systems' funding. For instance, more funds should be prioritized for the O&M of these systems, thereby enabling RMEs to ensure continuous system operations and reliability. Building off of this empirical understanding to the socio-technical barriers, the study contributes to practice by providing practical and policy recommendations that could best overcome the identified barriers, thereby contributing to addressing the wastewater challenges in the underserved Black Belt's communities.

MONITORING FLOW THROUGH A CONTROL VALVE WITH DP METERING

SPEAKER(S): Louis Antos
SPEAKER ORGANIZATION: Cla-Val Company
DATE: Tuesday, April 12
TIME: 11:30-12:00
ROOM: 202A
ABSTRACT: Many control valve sites have no flowmeter installed. Yet knowing the flow demand can be vital information in order to manage the districts water resources. It also can help trouble shoot the control valve performance.

The principle of measuring flow by differential pressure across a venturi or orifice plate is well known. The flow is calculated by multiplying a constant times the square root of the differential pressure. A control valve is a variable orifice with a family of constants for each valve that are determined by laboratory testing. In a wide open condition, the constant is the Cv factor and over the full stroke it is the valve curve. A large number of precise measurements must be taken to generate the valve curve.

The control valve can be fitted with sensors that measure valve position and pressure drop (DP) across the valve. A Differential Pressure Transmitter can be used for this purpose, especially for low differential pressures. However, for most control valves the pressure drop can be measured by subtracting upstream and downstream pressure values from pressure transmitters.

The sensors are connected to a "flow computer" to calculate flow with the built in valve curve data. The calculated flow can be transmitted by standard 4-20 mA signal to SCADA for remote monitoring of flow at any number of control valve locations. Abnormal flows can be tracked and investigated for line breakage and repair. A display provides for local readout of calculated flow and sensor values.

There are two "flow computers" available. The low cost version is for single valve flow monitoring while a higher end model can monitor 2 or 3 control valves, such as a PRV station, with full screen display. It has four 4-20 mA outputs for multiple flows and additional sensor information. Full value can be obtained with built in Modbus communications which allow monitoring of not only flows but all sensor information including upstream and downstream pressures and valve positions.

Most flowmeters require more than 10 pipe diameters of straight pipe upstream. The control valve DP Metering system is relatively unaffected by upstream and downstream piping since it relies on pressured drop through the valve. Due to manufacturing tolerances accuracy is generally in the 2-3% range and is intended for flow monitoring purposes. Custody transfer applications requiring 1% or better certification should consider flowmeters.

UNIVERSAL AUTOMATION: USHERING IN A NEW ERA OF PLUG-AND-PLAY AUTOMATION

SPEAKER(S): Louis Arone
SPEAKER ORGANIZATION: Schneider Electric
DATE: Tuesday, April 12
TIME: 11:30-12:00
ROOM: 202B
ABSTRACT: Next Generation Automation Platform… Are you ready to think outside the box?

There has been a lot of talk around the Industrial 4th revolution, IIOT and smart factory over the last few years. But when you look at the factory floor and PLC control, not much has changed. The time is right for a fundamental change to take place on the factory floor. So, ask yourself, what will the factory floor look like in 5-10 years when smart devices are ubiquitous. Smart connected devices could one day span from the push buttons to instrumentation to motor starters. Everything is connected. So, if all the devices in the field are smart, and we need to control a tank level with a VFD controlled motor, why do I need the PLC to poll the level sensor for information only for the PLC to send information to the motor. Why not have the level sensor talk directly to the VFD. This is the essence of Universal Automation. Pushing the control to the edge. This is smart devices talking to other smart devices.

What is Universal Automation? If you were to ask a customer about their PLC or PAC control on their factory floor…many or most have standardized on a specific vendor platform. Over the years they have done this because of the expertise the user may have with their existing staff and/or the cost to maintain spare, software and support from multiple vendors. So, their solution is to standardize on one platform. The downside to this approach is that the customer is locked… Locked to the technology and innovation that a single vendor can provide. Can you image a world when an industry wide factory floor standard exists that governs how all control software, hardware and smart devices are programmed and communicate? A standard that allows the customer to plug and play with any vendor. This is the promise of Universal Automation. This puts the onus on the vendor to manufacture innovative best in class products and solutions for the market place. This is exactly what the IT world has accomplished many years ago. Now it is time for the factory floor.

Schneider Electric will discuss the following: The vision of the future factory floor; What is Universal Automation and why is it needed?; What does universal automation for WWW look like?; How can automation achieve sustainable water options?

LESSONS LEARNED

SPEAKER(S): Jeremy Creel
SPEAKER ORGANIZATION: Jefferson County
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 106A
ABSTRACT: Learning from each other's experiences has always been a huge part of how we become successful operators and manage our daily activities in wastewater treatment. My wastewater journey started as a teenager working "summer help" at the local

wastewater plant back in 1995. Going from summer help to laborer, laborer to plant operator, plant operator to lead operator, and finally lead operator to plant manager; I have made numerous mistakes along the way. I have also been fortunate enough to work at numerous facilities and learn from some great operators over the years. I would like to share some of the victories as well as some of the mistakes I have made over the last 25 years. Maybe some of the things that I think we do well will help you as an operator or maybe by sharing some of my mistakes will prevent you from making the same ones.

Briefly discuss wins/losses in Phosphorus treatment; Leaving equipment out of service; Compliance Issues; Automation.

MEETING ULTRA-LOW PHOSPHOROUS LIMITS WITH SBR AND FILTRATION TECHNOLOGY: A CASE STUDY OF THE RAINBOW CITY WWTP

SPEAKER(S): Bryan Pate
SPEAKER ORGANIZATION: InSite Engineering, LLC
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 106B
ABSTRACT: The Rainbow City Utilities Board was faced with ultra-low phosphorous limits from the discharge of their new WWTP into Big Wills Creek. We will review the design parameters, process considerations, and four years of real-world data since the plant came online.

ASSESSED AND ADDRESSED PREVENTS CATASTROPHIC FORCE MAIN FAILURE DURING THE PANDEMIC

SPEAKER(S): Jimmy Stewart
SPEAKER ORGANIZATION: Advanced Water/Wastewater Infrastructure Solutions
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 107A
ABSTRACT: This was accomplished through a proactive assessment, and rehabilitation program. A client dealing with an aging 14-inch ductile iron forcemain showing signs of corrosion and deterioration spanning over 2.5-miles, replacing, or complete rehabilitation the forcemain was not economically feasible. Evaluation of condition assessment options were compared to determine the best means possible for determining the condition and remaining useful life (RUL) of the pipeline. It was determined that using an Inline Free-swimming Electromagnetic tool that would provide a full 360° wall thickness information on the pipeline both internally and externally was the most effective method to determine the current condition and RUL of the pipeline. The Inline assessment was completed, which was a collaborative effort with the operations and maintenance staff of the utility. Installation of deployment and retrieval stations, pipe pigging to clean pipes, and bypass of the lift station and forcemain was completed by operations staff. The results of the assessment found that (7.5%) of the 13,200 feet of pipe had consistent corrosion and deterioration to the metallic pipe walls. Using this information, the client determined that pipeline replacement or rehabilitation was necessary in this specific area. Because the location of this pipe was under a busy roadway with limited adjacent easements to install a new pipe, the decision to go with rehabilitation was straightforward. After looking at various rehabilitation options, the client determined that because of its ability to traverse deflection and bends, as well as only need two excavations, The rehabilitation process was selected to rehabilitate the pipe. Construction Product Marketing supplied the material and provided on-site technical support for the client's maintenance crews that completed the excavations, removal of access portal pipe, pipe cleaning, and closure of the portals. CPM and the crews completed the installation of the Liner over two working days, allowing the client to have the construction aspect of this project completed in 1 work week. The proactive and comprehensive approach to the condition assessment and rehabilitation of this forcemain likely prevented a future SSO's, as well as economically and efficiently extended the life of this forcemain for many years.

UPDATE ON MEMBRANE TECHNOLOGIES

SPEAKER(S): John Hughes
SPEAKER ORGANIZATION: SUEZ WTS
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 107B
ABSTRACT: Over the past 20 years, membranes have transitioned from a niche technology to a widely accepted option for many municipalities. Membranes are considered a go-to technology for plants requiring more flow out of the same footprint or plants facing stringent effluent criteria.

This presentation will provide exposure to membrane technology and detail the membrane current state of evolution including but not limited to: Technology advancements in acceptance, aeration, power consumption and membrane footprint; Membrane life well surpassing original life expectancy; Membrane emerging technologies and what comes next.

MATERIAL INCREASES, SUPPLY-CHAIN ISSUES AND COVID-19

SPEAKER(S): Pete Bredehoeft
SPEAKER ORGANIZATION: HDR, Inc.
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 202A
ABSTRACT: This presentation will outline the current price increases in construction materials, supply-chain issues, and Covid-19 impacts. This presentation aims to provide Owners, Municipalities, and Consultants with current data that may impact their current for future capital projects outlining current inflation impacts, material impacts, market volatility issues, and Covid-19

impacts as well as suggested actions and cost estimating best practices. Sources include Engineering News-Record, U.S Bureau of Labor Statistics, Associated General Contractors of America, and other industry resources as well as data from recent bid tab history of current projects.

GROUNDWATER REMEDIATION FOR A RELEASE OF MERCAPTAN USED AS A NATURAL GAS ODORANT

SPEAKER(S): Brad Newton
SPEAKER ORGANIZATION: McFadden Engineering
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 202B
ABSTRACT: Natural gas by itself is odor-free, but because it is combustible, odorization is required. Federal regulations mandate that odorant be added to combustible gases so that an individual can detect the gas. Most of these odorants contain a blend of organic sulfur compounds such as tertiary butyl mercaptan (TBM), ethyl methyl sulfide (EMS), and others.

McFadden Engineering, Inc. (MEI) was retained by a natural gas utility to assist with investigating a mercaptan odor that was present in a community near a natural gas distribution gate. Previous records and information indicate that a release from an aboveground odorant storage tank occurred in 2008. The affected area of the release was then examined, and an environmental remediation company was hired to clean up the spill. Over three years later, the utility began receiving complaints of "gas leaks" from residents in the vicinity of the site.

These complaints prompted an investigation that led to the discovery of contaminated groundwater springs as the cause of the odor. Testing of the groundwater led to the determination that reduced sulfur compounds were present in groundwater, including TBM and EMS.

An extensive site assessment utilizing over 164 soil borings and 113 groundwater monitoring wells was conducted to determine the extent of the groundwater plume. Once the extent of the contaminant plume was determined, extensive research was performed to develop options for mitigation of the odors. A groundwater remediation system was implemented using a robust ozone treatment process that includes 56 recovery wells, two ozone treatment facilities and a groundwater transfer pump station. The major issues with this project were: Identifying target treatment goals by both state and federal regulators; Delineation of the contaminant plume; Development of the appropriate treatment process and permitting given the urgency of the project in the beginning; Landowner access negotiations; Ongoing litigation; Site security; Operation and maintenance of treatment equipment. In all, the groundwater treatment systems have treated approximately 424 million gallons of groundwater while effectively destroying TBM, EMS, and other reduced sulfur compounds that were causing the odors.

Recent interpretations of the groundwater plume show major reductions in the size of the plume as well as concentrations of these compounds in groundwater.

PFAS: THE WILD WILD WEST OR IS IT?

SPEAKER(S): Lindsay Boone
SPEAKER ORGANIZATION: Enthalpy Analytical
DATE: Tuesday, April 12
TIME: 1:15-2:00
ROOM: 201A
ABSTRACT: Analytical methodologies for Per & Polyfluorinated Alkyl Substances (PFAS) are currently in an ever-evolving climate and with consistent changes and modifications to both existing and new PFAS analytical methods there is also a need for continuous updates in regard to lab analysis. Analytical methodologies available from both the EPA and DOD can dictate PFAS sampling and reporting requirement for both drinking water and wastewater facilities. In this presentation we will cover PFAS methodologies and how they can impact facilities such as in UCMR5 (Unregulated Contaminant Monitoring Rule) and their potential future impacts on NPDES permits. Also, covered will be how PFAS analytical methods can help to guide personnel in developing a strategic PFAS sampling plan for both drinking water and wastewater facilities.

HOW THE CITY OF TUSCALOOSA INTEGRATED A CMOM PROTOCOL TO REDUCE SSO'S

SPEAKER(S): Ron Smith and Chris Meggs
SPEAKER ORGANIZATION: City of Tuscaloosa Water and Sewer Department (TWSD)
DATE: Tuesday, April 12
TIME: 2:00-2:45
ROOM: 106A
ABSTRACT: The City of Tuscaloosa's Water and Sewer Department (TWSD) oversees over 500 miles of sewer lines for nearly 100,000 residents. Prior to 2009, TWSD did not have an established proactive maintenance protocol, due to the resources and time demanded by reactive maintenance needs. By 2009, TWSD was addressing over 200 sanitary sewer overflows (SSOs) annually. TWSD entered a consent decree with the Alabama Department of Environmental Management in 2009, requiring the entire collection system to be assessed in a ten-year period. TWSD looked to establish a well-implemented Capacity, Management, Operations, and Maintenance (CMOM) program to improve maintenance processes, workflows, and prioritization planning.

In 2015, TWSD purchased a Sewer Line Rapid Assessment Tool, or SL-RAT, to help cover ground quickly and detect risk areas. The SL-RAT is a device that uses sound waves to provide a blockage assessment of gravity sewer lines. The acoustic scores, generated in three minutes for each segment, ranges from 0 to 10, where a 0 indicates a blocked pipe and a 10 indicates a pipe with plenty of flow capacity (0-3: POOR, 4-6: FAIR, 7-10: GOOD). Acoustic data helps system operators get a very quick and low-

cost understanding of pipe blockage conditions and guides tactical decision making on cleaning resource deployment.

Today, TWSD SL-RAT crews strive to inspect a minimum 10,000ft daily. We have the capability to operate two SL-RAT crews which could result in potential daily inspection of up to 30,000 ft. TWSD's process enables inspection results to trigger a series of follow-up protocols. Pipes with an inspection score of 0-3 are cleaned and assessed within 48 hours. Pipes with scores of 4-6 are addressed within 6-months, and segments with scores of 7-10 are addressed as needed but typically do not require follow up actions. This process enables areas with the highest risk to be identified and resources adequately deployed to mitigate risk.

Since most segments in TWSD's collection system score 6 or greater (72%), this screening process ensures resources are efficiently utilized. By reducing unnecessary cleaning, acoustic inspections help save over $300,000 and 2,000 crew hours annually. Most importantly, this condition-based approach helped reduce SSO occurrences by 70% between 2009 and 2021. This presentation will discuss the implementation process utilized by TWSD to integrate acoustic technology and implement a CMOM program to successfully reduce SSOs.

ENHANCED BIOLOGICAL PHOSPHORUS REMOVAL (EBPR). WHAT YOU CAN AND CANNOT CONTROL – BEST DESIGN PRACTICES.

SPEAKER(S): Nick Barczewski
SPEAKER ORGANIZATION: Ovivo
DATE: Tuesday, April 12
TIME: 2:00-2:45
ROOM: 106B
ABSTRACT: EBPR configurations have been successfully implemented in our industry for decades. These systems utilize the unique ability of polyphosphate accumulating organisms (PAOs) to assimilate large amounts of phosphorus and store it intracellularly as polyphosphate granules. Phosphorus can then exit the treatment plant within the biomass wasted from the plant, enabling utilities to meet their effluent TP permits in the liquid stream with an environmentally friendly and cost effective solution.

The implementation of EBPR seems simple on paper. PAO populations grow in EBPR plants by cycling the biomass through anaerobic (feast – P release) and aerobic (famine – P uptake) phases. The typical design approach is to add anaerobic selectors before the aerobic basins and develop EBPR from there. From a technology perspective, nothing more than small tanks, mixers, and perhaps ORP probes are needed for the anaerobic selectors. Nevertheless, there are many other aspects involved in keeping the balanced cycle of phosphorus release and uptake carried out by PAOs. Wastewater practitioners, operators, and technology providers can address some variables in the design phase and with operating strategies as well; however, there are other variables that nobody can control. For those instances, a good design practice is to have provisions to weather the rain when EBPR is not at optimum conditions.

This presentation will address the following design practices: Importance of Volatile Fatty Acids (VFAs). PAOs can't store other forms of carbon; Competition for VFAs from oxygen and/or nitrate entering the anaerobic selectors; Out-competition of PAOs by glycogen accumulating organisms (GAOs).

Tools in the toolbox: Design provisions to address EBPR upsets; Options for Plan B; Watch the sludge blanket to avoid P release in the secondary clarifiers; Manage phosphorus coming back with liquid returns from other processes.

These design practices will be presented based on the experience of Ovivo with two EBPR configurations within the Carrousel® oxidation ditch family: the A2C™ and the AlternatIR™ systems.

INJECTION GROUTING TO REDUCE FLOW TO WWTP

SPEAKER(S): Wendy Rouleau
SPEAKER ORGANIZATION: Prime Resins
DATE: Tuesday, April 12
TIME: 2:00-2:45
ROOM: 107A
ABSTRACT: When looking to reduce flow to waste water treatment plants, repair options are often posed as CIPP lining OR grouting. Both of these methods have their place in the repair process, so understanding when each method works best as well as how both methods can work well together will give the best long term results… and at the least cost to the owner.

A fresh approach is presented showing how grouting reduces flow to WWTP for small coastal communities with greater than average rainfall. Case studies show that with investigation and understanding of the repair needs, communities were able to reduce the cost of the planned repairs resulting in extra dollars (as much as $1.8 million), which could possibly be made available for even more CIPP lining and/or grouting repairs.

There are many benefits to grouting and arguments against grout, but through real-world scenarios with insight from all angles of repair - manufacturer, client, and contractor - municipal stakeholders and contractors learn how injection grouting is an ideal complement to their CIPP practice. In addition, engineers will understand how grouting, in certain situations, can be a more efficient and effective answer to controlling infiltrations than CIPP lining.

ADVANCING FORWARD OSMOSIS FOR ENERGY-EFFICIENT WASTEWATER TREATMENT TOWARDS ENHANCED WATER REUSE

SPEAKER(S): Dr. Shiqiang (Nick) Zou, Ph.D.
SPEAKER ORGANIZATION: Auburn University
DATE: Tuesday, April 12
TIME: 2:00-2:45
ROOM: 107B
ABSTRACT: Current wastewater treatment can effectively remove the contaminants; however, the effluent is still not widely reused because of some undesired substances like pathogens and trace organic chemicals. Membrane-based technologies have emerged

as a robust and more efficient alternative to current treatment practice to promote water reuse. Among these membrane processes, forward osmosis (FO) utilizes an osmotic pressure gradient across a semi-permeable membrane to reclaim high-quality water. Still, several key challenges remain to be addressed towards broader FO application, including energy-intensive draw regeneration to yield product water and salinity buildup in the feed solution. To bypass energy-intensive draw regeneration, commercial solid fertilizers were utilized as a regeneration-free draw solute (DS), harvesting freshwater towards direct agricultural irrigation. However, using nutrient-rich fertilizers as DS resulted in an elevated reverse solute flux (RSF). This RSF, known as the cross-membrane diffusion of DS to the feed solution, led to deteriorated solute buildup on the feed side, reduced osmotic driving force, increased fouling propensity, and higher operating cost. To effectively mitigate solute buildup while achieving energy-efficient water reclamation, a parallel electrodialysis (ED) device was integrated into FO for DS recovery in the feed solution. The salinity in the feed solution was consistently controlled below 1 mS cm-1 via the hybrid FO-ED system. Considering solute buildup is only a consequence of RSF, direct control of RSF was further investigated via operational strategy (i.e., an electrolysis-assisted FO) and membrane modification (i.e., surface coating of zwitterion-functionalized carbon nanotubes). Significantly reduced RSF (i.e., 50% reduction) was obtained in both approaches with minor energy/material investment. The abovementioned research projects are among the earliest efforts to address multiple key challenges of FO during the practical application, facilitating the transformation of centralized wastewater management to a decentralized water reuse hub in local communities.

GROUNDWATER REMEDIATION WITH IN-SITU ELECTROGENERATED REAGENT

SPEAKER(S): Eric Jordan
SPEAKER ORGANIZATION: Aqua Metrology Systems
DATE: Tuesday, April 12
TIME: 2:00-2:45
ROOM: 202B
ABSTRACT: Groundwater remediation treatment technologies are limited by inherent process weaknesses, high capital, operating and lifetime costs, and they lack automation and performance controls. Innovation is needed to address these limitations and provide utilities with technologies to address contaminants of concern that threaten public health.

One such innovative is a new technology developed by Aqua Metrology Systems (AMS) to generate a stannous or ferrous ion reagent in-situ via an electrolytic process to address a wide range of inorganic and trace metal contaminants that threaten drinking water. The fully automated, on-demand, in-situ generator is integrated with an online monitoring capability to measure contaminant levels, in real time, at critical treatment process steps.

In the case of manganese remediation, ferric hydroxide is an effective sorbent material and powerful coagulant successfully implemented for toxic metal removal in a spectrum of applications. However, this treatment approach is reliant on the transportation, storage, handling and use of bulk chemicals which comes with inherent concerns. With an in-situ electrolytic reagent generation approach, the system uses a food grade iron precursor and an in-situ electrolytic generator to create a ferrous reagent onsite and on demand. The process is simple, effective, and sustainable, especially at smaller scales.

There is no shelf life of the reagent and as a result, operational costs are drastically reduced since shipping and handling of a hazardous solution are eliminated. The modular process design easily integrates into existing infrastructure; there are no special health and safety risks, or special handling required. Because the system can be fully controlled, monitored and optimized remotely 24/7/365, the presence of personnel on site for supervision is not required, further reducing operating costs compared with traditional bulk chemical treatment systems.

The lifetime costs of this system are considerably less than that of alternative systems with their attendant challenges of toxic waste disposal, high inertia, large footprints, chemical storage, and handling that make them cost prohibitive remediation solutions. This technology offers 60-80% cost savings and rapid return on investment (less than 1 year) compared to bulk chemicals; it also supports zero net carbon goals. Case studies from this innovative in-situ electrogenerated reagent remediation system will be presented.

ADDRESSING PFAS THROUGH SOURCE WATER ASSESSMENTS AND ADVANCED TREATMENT

SPEAKER(S): Samantha Black
SPEAKER ORGANIZATION: HDR
DATE: Tuesday, April 12
TIME: 2:00-2:45
ROOM: 201A
ABSTRACT: Per- and poly-fluoroalkyl substances (PFAS) are compounds of emerging concern in the water industry. PFAS are persistent and stable in the environment due to the strong chemical bond between carbon and fluorine atoms. The City of Greensboro (City) detected PFAS in their drinking water during the Third Unregulated Contaminant Monitoring Rule (UCMR) with combined levels of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) sometimes exceeding 100 ng/L. These findings led to a two-year study to identify hotspots of PFAS contamination in the City's raw water supply. Using the EPA Health Advisory Level (HAL) of 70 ng/L of combined PFOS and PFOA concentration as a baseline for treatment resulted in the installation of a temporary powdered activated carbon (PAC) system to remove PFAS at the City's Mitchell Water Treatment Plant (WTP). Now, the City desires the design and construction of a permanent, full-

scale advanced treatment process to provide more robust and sustainable PFAS removal from their water supply.

One of the first steps needed to identify an optimal PFAS treatment process is to evaluate technologies using site-specific conditions. Research to date has shown PFAS removal treatment effectiveness may vary depending on the water source, pretreatment processes, and other operational conditions. Therefore, a technology that works for one utility may not work for another. Additionally, treatment effectiveness is highly dependent on feed water quality. Bench and pilot testing under site-specific conditions prior to full-scale design of PFAS treatment systems is crucial.

Rapid small-scale column testing (RSSCT) is a proven, quick, and effective method for evaluating the treatability of PFAS. The goal of the bench-scale testing project was to evaluate four GAC medias, four IX resins, and a novel sorbent using cyclodextrin polymers designed for PFAS removal in parallel and identify the best media and resin for PFAS removal. RSSCT results have informed future piloting, which commenced in October 2021.

This presentation will provide a background of the PFAS challenges the City has faced and is currently addressing, including results from the two-year watershed study and PFAS removal using PAC. Results from the RSSCT evaluations and pilot studies will be shared, including total and individual PFAS breakthrough, bed volumes treated, operational cost considerations, and lessons learned to assist with future RSSCT studies.

CHAIN OF CUSTODY FORMS – DOCUMENTATION TO PROTECT YOU AND YOUR PLANT

SPEAKER(S): Lennette West
SPEAKER ORGANIZATION: Revere Control Systems
DATE: Tuesday, April 12
TIME: 2:45-3:30
ROOM: 106A
ABSTRACT: This presentation will cover what a chain of custody (COC) is, the regulations governing COCs, and what needs to be included on them. We will discuss the different types of COCs. Also, discussed will be examples of why COCs are so important to protect the integrity of the samples and give real world examples of regulatory enforcement actions. We will also go over general sampling techniques and procedures to also aid in the keeping the integrity of samples. All of this will help protect the data being generated for compliance reporting (DMR's and MORs).

SEQUENCING BATCH REACTORS

SPEAKER(S): James Aitkenhead
SPEAKER ORGANIZATION: Lakeside Equipment
DATE: Tuesday, April 12
TIME: 2:45-3:30
ROOM: 106B
ABSTRACT: My name is James Aitkenhead, and I am a Regional Sales Manager for Lakeside Equipment. One of my duties is to design SBR systems for Lakeside and Alabama is my territory.

I would like to do a presentation on the use of SBR systems for biological treatment. SBR systems can be designed in basins that allow for a smaller footprint. The equipment can be designed to be retrievable or have redundancy so the system would not need to be taken off line for repairs. The effluent from an SBR can meet strict effluent requirements. I would also like to discuss two (2) Lakeside systems currently operating in Alabama.

CORROSION IN SEWER COLLECTIONS – CAUSES AND MITIGATION

SPEAKER(S): Adam McMillian
SPEAKER ORGANIZATION: The Sherwin Williams Company
DATE: Tuesday, April 12
TIME: 2:45-3:30
ROOM: 107A
ABSTRACT: The purpose of my presentation is to educate on the reasons for corrosion within the sewer collection and treatment mechanisms, provide a rehabilitation process and discuss linings to prevent future premature asset loss. Focus will be put on concrete deterioration where a high presence of H2S gas occurs. A cases study of a manhole rehabilitation in Wilmington NC will be presented as a summary of the ideas and to tie everything in the presentation together. Also, a summary of potential pitfalls and challenges to the process will be discussed.

INDUSTRIAL STRENGTH REUSE: UTILIZING MBR+RO TO REDUCE WATER CONSUMPTION BY 70% AT A TRACTOR MANUFACTURING FACILITY

SPEAKER(S): Larry Morris
SPEAKER ORGANIZATION: Kubota Membrane USA Corporation
DATE: Tuesday, April 12
TIME: 2:45-3:30
ROOM: 107B
ABSTRACT: Membrane bioreactor (MBR) treatment has been applied to the industrial wastewater produced by the coating process at Kubota Industrial Equipment (KIE) in Jefferson, GA, as well as domestic wastewater from the office building. By adding a reverse osmosis (RO) skid downstream of the MBR, the effluent can be recycled. The total treated effluent is reused for the coating pre-treatment process; 27,000 gal/day is reused for the manufacturing process, reducing the need of

public water from 37,000 to 10,000 gal/day (70% reduced by water reuse). This saves on total water consumption as well as operational costs incurred by water use in the coating process.

The total wastewater is a combination of domestic grey water from the office building and pre-treated wastewater from the tractor coating process, that can produce up to 23,000 mg/L of BOD and 9,360 mg/L TSS. Industrial wastewater is pre-treated for oils and heavy metals by coagulation, pH adjustment, followed by a gas energy mixing system where solids and liquids are separated by flotation. The pre-treated industrial wastewater and office building grey water are then combined in an equalization tank and subjected to MBR.

MBR treatment is accomplished in conjunction with an AO biological treatment with a single recycle from the membrane tank to the anoxic tank. Kubota microfiltration flat sheet submerged membrane units are employed in the membrane tank. BOD and TSS are treated by MBR to near non-detect levels; however, total dissolved solids require further treatment. Therefore, the MBR effluent is treated by dual stage RO that can accomplish a reduction in electrical conductivity up to 99% (619 µS/cm influent, 4.75 µS/cm effluent).

When MBR is combined with RO, the total effluent can be recycled and utilized. At KIE, the MBR plus RO process has been in operation for eight years and reduces manufacturing water consumption by 70% and decreases annual water costs by $50,000. This presentation will detail the industrial wastewater treatment and subsequent water reuse at the KIE plant in Jefferson, GA.

GROUNDWATER WELL REHABILITATION – CONDITION ASSESSMENT AND OPTIMIZATION

SPEAKER(S): Leigh Sexton
SPEAKER ORGANIZATION: HDR
DATE: Tuesday, April 12
TIME: 2:45-3:30
ROOM: 202B
ABSTRACT: This presentation will discuss a groundwater condition assessment protocol developed to assist utilities in returning flow to their groundwater wells. Many utilities across the SE with groundwater infrastructure have not kept up to date with proper well rehabilitation which can result in a decline in production capacity. Through condition assessment a utility can evaluate changes in performance and water quality over time which can include sampling that can pinpoint the best path forward for well cleaning. Specialized labs such as Water System's Engineering (WSE) out of Kansas City can be very helpful in pinpointing the source of decline in well performance and tailored recommendations for restoring capacity. This presentation will include examples of well rehabs across the country and recommendations for how regular well condition assessment can maintain a healthy groundwater system for long term operation.

GOT PFAS? SOUTHEASTERN UTILITIES TACKLE PFAS CONTAMINATION IN DRINKING WATER

SPEAKER(S): Reed Barton
SPEAKER ORGANIZATION: CDM Smith
DATE: Tuesday, April 12
TIME: 2:45-3:30
ROOM: 201A
ABSTRACT: Per- and Poly Fluoro Alkyl Substances (PFAS) continues to be a challenge for water utilities in Alabama, Mississippi and across the US. The state of the science to detect, classify, and treatment PFAS compounds is continually evolving. Likewise, the regulatory environment surrounding PFAS contaminants, both at State and Federal levels, is also rapidly changing. Several States in the Southern US are among the hardest hit by PFAS contamination of public water supplies; and the impacted utilities have offer case studies for the professional water community to gain knowledge and lessons learned. This presentation will discuss PFAS contamination in multiple areas of the Southeast, including highlights of North Carolina's Cape Fear River Basin, an area that has experienced significant PFAS contamination affecting more than a dozen public utilities that serve a population of more than 1-million people. Select case studies from multiple utilities that are facing different PFAS contamination challenges will be highlighted, including topics such as PFAS discovery, treatability studies (efficacy and cost), full scale design and construction of PFAS removal systems, public relations, and risk communications.

MISSISSIPPI DRINKING WATER AND CLEAN WATER STATE REVOLVING LOAN FUND PROGRAM UPDATES

SPEAKER(S): Harry Gong
SPEAKER ORGANIZATION: Mississippi State Department of Health
DATE: Tuesday, April 12
TIME: 9:30-10:15
ROOM: 202B
ABSTRACT: Updates from both the Drinking Water and Clean Water State Revolving Loan Funds Programs regarding funding for projects will be given by both agencies. Additionally updates regarding additional funding from the American Rescue Plan Act (ARPA) and the Infrastructure Investment and Jobs Act will be given regarding how these funding sources are being administered by each program.

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ADS Environmental	316
Aegion	109
American Cast Iron Pipe Company	306
American Tank Maintenance	532
Aqua Metrology Systems	311
Aqua Products, Inc.	321, 322
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AWWA	113
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Bar Environmental	509
C. C. Lynch & Associates, Inc.	808, 810
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CB&I Storage Tank Solutions	427
Carboline	727
Central Pipe Supply, Inc.	508
Central Service Association	410

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ClearWater Solutions	111
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Continental Utility Solutions	513
Cornerstone H2O	213
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CUES, Inc.	409
Denali Water	428
Duke's Root Control, Inc.	623
Duperon	Equipment Area Only
Eco-Tech, Inc.	119, 121
Electric Machine Control, Inc.	106
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Enersolv	723
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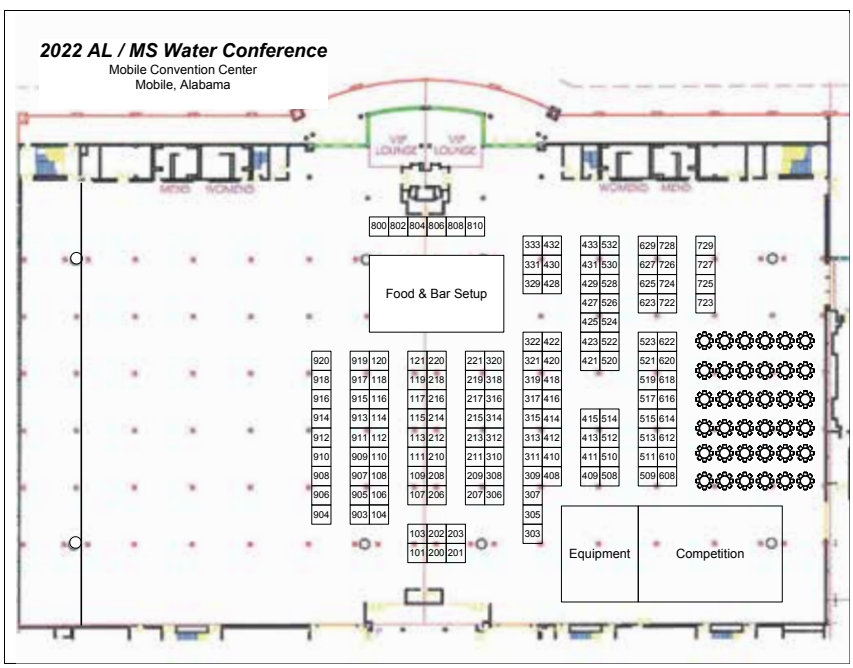

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ESG Operations Inc.	117
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Garver	207
Gelco Supply	517
Goforth Williamson	414
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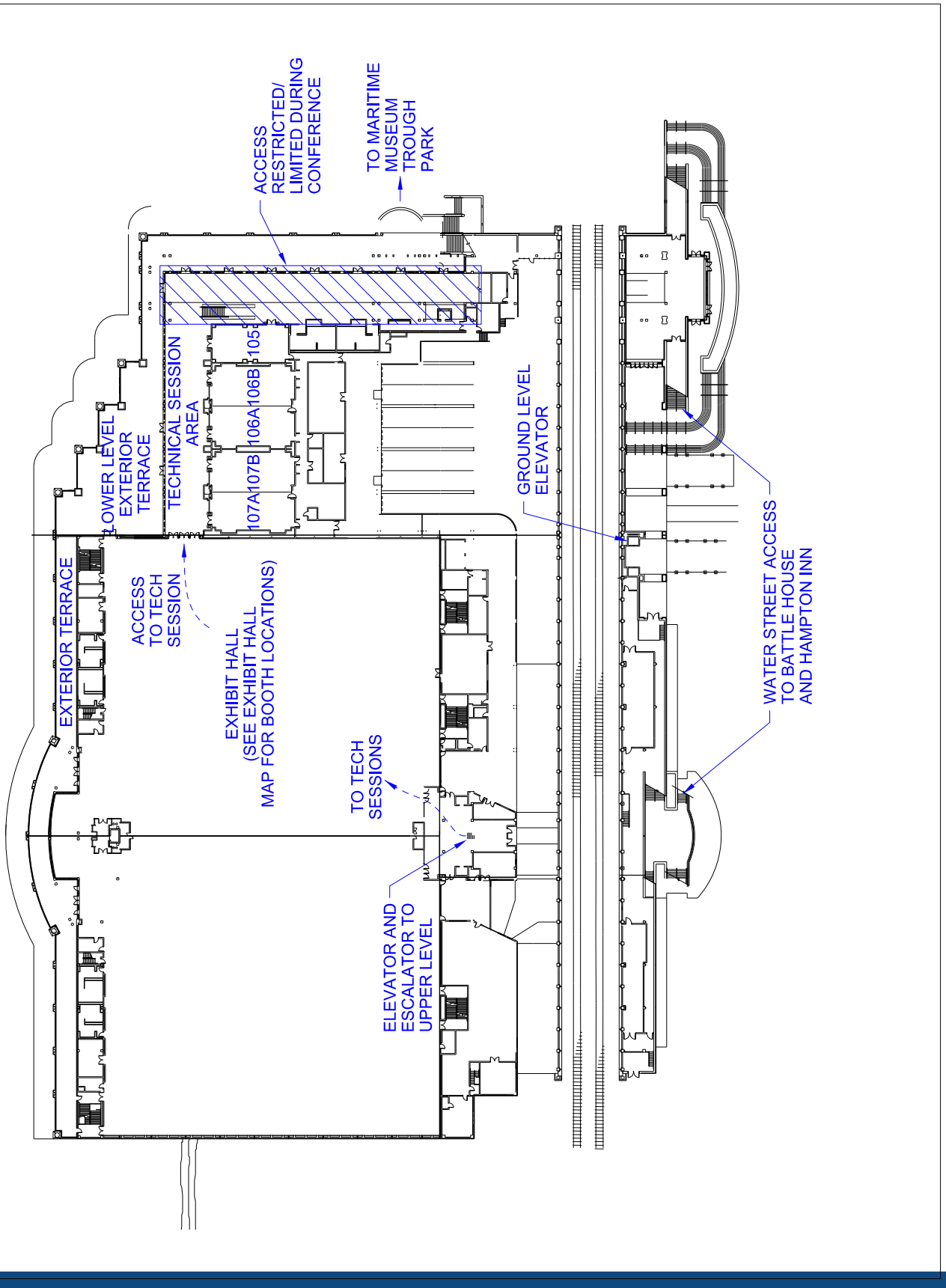
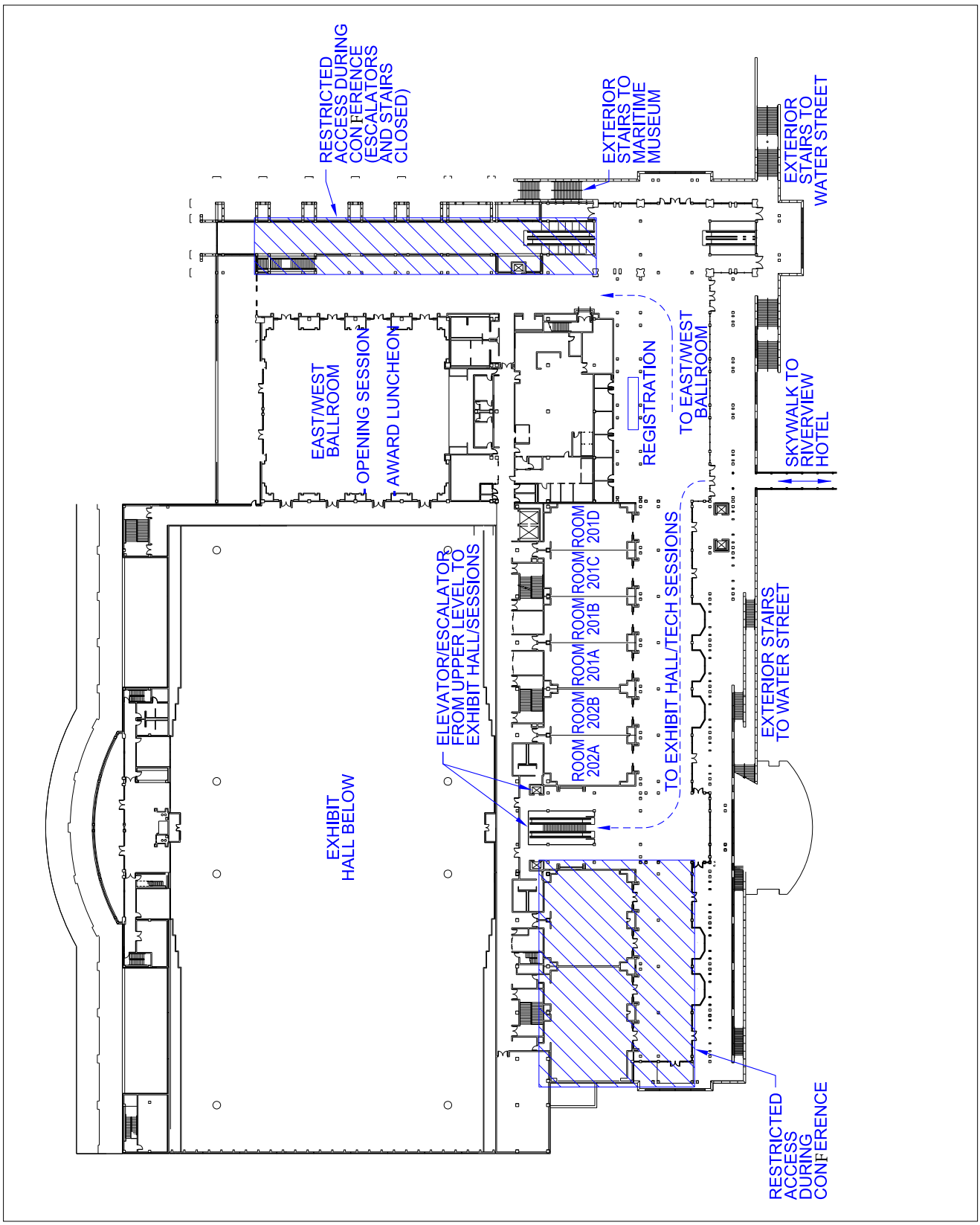
Wachs Utility Products	415
Waggoner Engineering	625
WEF	217

2ND LEVEL


ACCESS RESTRICTED/ LIMITED DURING CONFERENCE
TO MARITIME MUSEUM TROUGH PARK
LOWER LEVEL EXTERIOR TERRACE
TECHNICAL SESSION AREA
105
106A106B
107A107B
GROUND LEVEL ELEVATOR
EXTERIOR TERRACE
ACCESS TO TECH SESSION
EXHIBIT HALL (SEE EXHIBIT HALL MAP FOR BOOTH LOCATIONS)
TO TECH SESSIONS
WATER STREET ACCESS TO BATTLE HOUSE AND HAMPTON INN
ELEVATOR AND ESCALATOR TO UPPER LEVEL

3RD LEVEL


RESTRICTED ACCESS DURING CONFERENCE (ESCALATORS AND STAIRS CLOSED)
EXTERIOR STAIRS TO MARITIME MUSEUM
EXTERIOR STAIRS TO WATER STREET
EAST/WEST BALLROOM
OPENING SESSION
AWARD LUNCHEON
REGISTRATION
TO EAST/WEST BALLROOM
SKYWALK TO RIVERVIEW HOTEL
ELEVATOR/ESCALATOR FROM UPPER LEVEL TO EXHIBIT HALL/SESSIONS
ROOM 202A
ROOM 202B
ROOM 201A
ROOM 201B
ROOM 201C
ROOM 201D
TO EXHIBIT HALL/TECH SESSIONS
EXTERIOR STAIRS TO WATER STREET
EXHIBIT HALL BELOW
RESTRICTED ACCESS DURING CONFERENCE

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Specification Rubber Products, Inc.

TTL

TESCO CONTROLS

VOLKERT

WAGGONER

Meals/Socials At-a-Glance

SUNDAY, APRIL 10		
Exhibit Hall Happy Hour	Exhibit Hall	4:00 p.m. – 5:30 p.m.
Collection Systems Committee Social	Fuse Factory	5:00 p.m. – 7:00 p.m.
Welcome Socials – Food & Drink	The Haberdasher	6:30 p.m. – 9:30 p.m.
	Veet's	6:30 p.m. – 9:30 p.m.
	Royal Street Tavern	6:30 p.m. – 9:30 p.m.

MONDAY, APRIL 11		
Breakfast Buffet – Battle House	Moonlight A – Battle House	6:30 a.m. – 8:00 a.m.
Breakfast Buffet – Riverview	Bon Secour Bay – Riverview	6:30 a.m. – 8:00 a.m.
Joint Awards Luncheon	East/West Ballroom	11:30 a.m. – 1:00 p.m.
Lunch Buffet	Exhibit Hall	11:30 a.m. – 1:00 p.m.
Exhibit Hall Happy Hour	Exhibit Hall	4:15 p.m. – 5:30 p.m.
Home Brew Competition	Exhibit Hall	4:30 p.m. – 5:30 p.m.
Dinner On Your Own		

TUESDAY, APRIL 12		
Grab & Go Breakfast	Exhibit Hall	7:00 a.m. – 8:00 a.m.
Women In Water Networking Breakfast	Harbor Room – Riverview	7:30 a.m. – 8:30 a.m.
Spouse Bingo & Brunch	Crystal Ballroom – Battle House	9:00 a.m. – 11:00 a.m.
Break in Exhibit Hall	Exhibit Hall	10:15 a.m. – 11:00 a.m.
Strolling Lunch	Exhibit Hall	11:30 a.m. – 1:00 p.m.
Happy Hour & Crumbl Cookies Social	Exhibit Hall	2:00 p.m. – 4:30 p.m.
YP & Operators Happy Hour	Harbor Room – Riverview	4:30 p.m. – 6:00 p.m.
Dinner Buffet with Casino Night	Bon Secour Bay – Riverview	6:00 p.m. – 9:00 p.m.

WEDNESDAY APRIL 13		
Grab & Go Breakfast	Convention Center-2nd Floor	7:00 a.m. – 8:00 a.m.

"Masters Week" at The AL/MS Water Conference Golf Tournament

This year's Water Conference starts off with our Annual Golf Tournament, Sunday of The Masters Tournament, so let's get the Golf going! This tournament is always fun and we are expecting a great turnout. The Golf Committee has several on-course opportunities for prizes, making this a very fun tournament. Lunch will be served after play and we'll finish up the putting contest then. Lunch again is provided by Compliance EnviroSystems, LLC. Marty Broussard will bring his Cajun touch to the conference serving Pork and Sausage Jambalaya with Red Beans … Justin Wilson style, I garontee !!!

The tournament will be held on Sunday, April 10, 2022, at Rock Creek Golf Club in Fairhope, Alabama. The tournament will begin at 9:00 a.m. with a Shotgun Start. Registration will begin at 7:00 a.m. with a light breakfast and coffee served prior to start. The Hydra Service sponsored Putting Contest will start at 8:00 a.m. and carry on throughout the morning, ending at lunch time. The final Putt-Off will take place after the round.

Rock Creek was designed by veteran golf course architect and Southeastern favorite Earl Stone. This 18-hole Baldwin County golf course stretches over 6,900 yards, making it perfect for long hitters yet fun and encouraging for all. Rock Creek is best known as a fun, player-friendly course for locals, members and visitors to the area. Course layout features well-manicured tree-lined fairways and generous landing areas. The large undulating greens offer a variety of shapes as well as two-tiered putting surfaces.

Rock Creek's signature hole – No. 2 is definitely unforgettable. This 434-yard par 4 drops 70 feet from the tee to the fairway with a second shot offering a force carry over wetlands to a green featuring a 30ft high, bulkhead wall. Many find this golf hole visually stimulating yet a true test of golf where strategy and accuracy define the difference between a bogey and birdie.

A short drive from Mobile, Rock Creek offers a truly unique golfing venue in south Alabama. You'll discover one of the best conditioned 18-hole championship golf courses in Baldwin County, Alabama. But don't take our word for it, Golf Digest has consistently rated it 4.5 stars since its inception. This prestigious accolade is only designated to approximately 500 golf courses nationwide. Even Zagat Survey stated, "One of the best (golf courses) in southern Alabama."

See you out there and hope you have a great Conference !!

A special THANK YOU to all of our Early-Bird Sponsors for this tournament. All stepped up this year to make this tournament possible. If you are interested in playing and/or sponsoring, please contact Rob Coleman at (205) 821-2511 or *rob@cahabawatersolutions.com*. Walk-ups are always welcome too, come join us.

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Fishing Tournament – Sunday, April 10, 2022

2022 AL/MS Water has assembled the beast captains to guide our members on a fishing adventure. Arrive at our launch point at 5:45 a.m. for a short angler meeting to receive directions prior to boarding the boats. Fishing departure time will be promptly at 6:00 a.m. Anglers will receive information on the launch point the day before the event to ensure that we are launching from the point closest to where the fish are biting! Captains will have tackle, bait, licenses, drinks, and ice. Please bring any other food and beverages you wish to have on board, as well as sunglasses and sunscreen. Boats will return to the dock at 11:00 a.m. for weigh-in. Captains will take care of cleaning and packaging fish. Gratuity is not included.

CUES

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JOINT ANNUAL CONFERENCE

Joint Annual Conference
Spouse Activities

Sunday, April 10th

6:00 a.m. – 2:00 p.m.
Fishing Tournament, Causeway (additional fees and registration required)

9:00 a.m. – 3:00 p.m.
Golf Tournament, Rock Creek Golf Club (additional fees and registration required)

6:30 p.m. – 9:00 p.m.
Welcome Event, Downtown Area

Monday, April 11th

6:30 a.m. – 8:00 a.m.
Breakfast at your Hotel

10:00 a.m. – 11:30 a.m.
Historic Downtown Trolley Tour

11:30 a.m. – 12:00 p.m.
Awards Buffett Open, Mobile Convention Center, Outside East/West Ballroom

12:00 p.m. – 1:00 p.m.
Joint Awards Luncheon, Mobile Convention Center, Outside East/West Ballroom

2:00 p.m. – 4:00 p.m.
Glass/Resin Art Class , Mobile Convention Center, Room TBA

4:15 p.m. – 5:30 p.m.
Exhibit Hall Happy Hour

Tuesday, April 12th

7:00 a.m. – 8:00 a.m.
Breakfast in the Exhibit Hall

9:00 a.m. – 11:00 a.m.
Bingo & Brunch, Battle House Hotel – Crystal Ballroom

2:00 p.m. – 4:30 p.m.
Exhibit Hall Social, with Crumbl Cookie

6:00 p.m. - 9:00 p.m.
Casino Night, The Riverview Hotel in Bon Secour Bay Ballroom

OPENING SESSION

Monday | April 11th

Stephanie Corso & Arianne Shipley

Rogue Water Group

On a mission to revolutionize the water industry, one story at a time.

APRIL
11
MONDAY

KEYNOTE AT OPENING SESSION

8:00 - 9:30 AM EAST/ WEST BALLROOM

Top 3 Tips to Communicate the Value of Water. Disclaimer: They may not be what you expect.

APRIL
12
MONDAY

TECHNICAL SESSION

8:45 - 9:30 AM ROOM 201B/C

30 Ideas in 30 Mins: Communicating Value

APRIL
12
TUESDAY

WOMEN IN WATER BREAKFAST

7:30 - 8:30 AM HARBOR ROOM (RIVERVIEW)

Blurred Lines: Bringing Your Whole Self to Life

AL/MS WATER
JOINT ANNUAL CONFERENCE

The Battle House Renaissance Mobile
26 North Royal Street, Mobile, AL 36602
Renaissance Mobile Riverview Plaza
64 South Water Street, Mobile, AL 36602
April 10th-13th, 2022
almswater.com

WOMEN IN WATER

April 10th-12th

APRIL
10
SUNDAY

WOMEN IN WATER MEET AND GREET

6:30-9pm at Royal Street Tavern (Battlehouse)

AL/MS WATER
JOINT ANNUAL CONFERENCE

APRIL
12
TUESDAY

TECHNICAL SESSION OPEN TO ALL PRESENTED BY STEPHANIE CORSO AND ARIANNE SHIPLEY WITH ROGUE WATER GROUP

8:45-9:30am Room 201 B/C

30 Ideas in 30 Mins: Communicating Value

On a mission to revolutionize the water industry, one story at a time.

APRIL
12
TUESDAY

WOMEN IN WATER BREAKFAST WITH STEPHANIE CORSO AND ARIANNE SHIPLEY

7:30-8:30am | Harbor Room (Riverview)

Blurred Lines: Bringing Your Whole Self to Life

For more information contact Nina Williams, Women in Water Chair nina.williams@jacobs.com

The Battle House Renaissance Mobile
26 North Royal Street, Mobile, AL 36602
Renaissance Mobile Riverview Plaza
64 South Water Street, Mobile, AL 36602
April 10th-13th, 2022
almswater.com

AL/MS WATER
JOINT ANNUAL CONFERENCE

AWWA Competitions

April 12th, 2022 | 2 - 4:30pm

Please join us this April as utilities from across Alabama and Mississippi compete in a variety of skilled team events including Best Tasting Water, Hydrant Hysteria, Meter Challenge, Pipe Tapping, and Top Ops. The winners from each category will qualify for AWWA Nationals June 2022!

For a detailed description on each event and rules please visit https://events.awwa.org/competitions.aspx or contact April Nabors, april.nabors@bwwb.org or 205-244-4181.

- BEST TASTING WATER
- HYDRANT HYSTERIA
- METER CHALLENGE
- PIPE TAPPING
- TOP OPS

McWANE DUCTILE

Alabama/Mississippi Section
American Water Works Association

AWEA
Alabama's Water Environment Association

Consolidated Pipe & Supply Company, Inc.

AL/MS WATER JOINT ANNUAL CONFERENCE

Young Professional & Operator Events

APRIL 10th-13th

YOUNG PROFESSIONALS AND OPERATORS

JOIN IN THE FUN

Home Brew Competition

SPONSORED BY YP

MONDAY 4:30 - 5:30PM

- Water used for home brew competition shall be from your local utilities water.
- Participants should submit at least 12 Bottles (144 oz) for taste test
- Best tasting beer will be awarded the Grand Prize

YP & OPERATORS POKER RUN

ALL DAY MONDAY

- Only ONE hand can be played per person.
- Players will draw 1 card from each of the vendors
- Cards cannot be shared with others.
- Best 5-card Poker hand wins the Grand Prize
- In the event of a tie, there will be a draw for a HIGH CARD to determine the winner.

YP & OPERATORS MEET UP

SUNDAY 6:30-9PM | VEETS (+ FOOD TRUCK)

HOME BREW COMPETITION

MONDAY 4:30 - 5:30PM | EXHIBIT HALL

YP & OPERATORS POKER RUN

ALL DAY MONDAY | WINNER REVEALED AT CASINO NIGHT

POSTER JUDGING

TUESDAY AFTERNOON | UPPER CONCOURSE

YP & OPERATOR SOCIAL

TUESDAY 4:30-6PM | HARBOR ROOM (RIVERVIEW)

Tuesday Night Dinner & Reception

TUESDAY | APRIL 12TH, 2022 | 6:00-9:00 PM

AL/MS WATER JOINT ANNUAL CONFERENCE

CASINO NIGHT

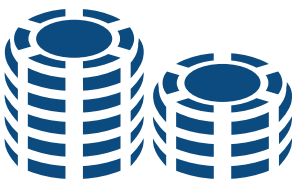
The Riverview Hotel in Bon Secour Bay Ballroom

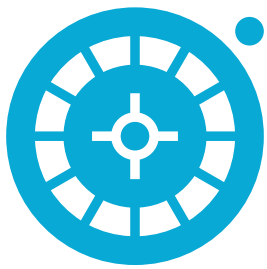
Casino Night will include:

Black Jack
Craps
Roulette
Money Wheel
Texas Hold em and more!

Using casino "money", all attendees can play games to win great prizes.

DJ, Buffet Dinner and a Photo Booth included!





Use Paper Responsibly

Today's forest industry is working hard to become one of the greenest industries on earth.

Paper is an essential part of human civilization. While we all use and depend upon electronic communications, it is easy to ignore that it comes at an environmental cost. Worldwide spam email traffic creates greenhouse gases equivalent to burning two billion gallons of gasoline yearly, with numbers rising. More than $55 billion in toxic e-waste material is thrown away every year in the US alone, with a recycling rate of only 20% compared to 64.7% for paper.

No industry is perfect. But the paper industry has made, and continues to make, huge investments in environmental responsibility. Specifying and buying paper from certified sources ensures the continuation and growth of carbon absorbing forests. Using paper with appropriate amounts of recycled fibre helps preserve forests, conserve energy, and maximize fibre usage through paper lifecycles.

AL/MS WATER
JOINT ANNUAL CONFERENCE

Thank You

FOR ATTENDING THIS
YEAR'S CONFERENCE

2023 CONFERENCE DATES

April 9 – 12, 2023
Arthur R. Outlaw Convention Center
Mobile, Alabama

American Water Works Association

Water Environment Federation