

2021 Southern Oregon Subsection Water & Wastewater Short School

September 21-23, 2021

VIRTUAL

2021 Southern Oregon Subsection Water & Wastewater Short School			
September 21-23, 2021			
VIRTUAL			
Tuesday 9/21	Water	Wastewater	Both
7:30 AM - 8:00 AM EXHIBITOR TIME			
8:00 AM - 9:00 AM	Real World Considerations for Pump Design, Operation, and Troubleshooting Steve Truitt, Penn Valley Pump	Modern Lift Station Design (Hr 1) Simon Cartwright, Xylem	Developing Operator Decision Making Skills for Emergency Zoom Presentation Mark Walter, Waterdude Solutions
9:05 AM - 10:05 AM	Responses to a Public Safety Power Shutoff (PSPS) Zoom Presentation Chris Wanner, Portland Water Bureau	Modern Lift Station Design (Hr 2) Simon Cartwright, Xylem	Evacuation Safety and the Role of the Competent Person Hr 1 Eric Fullan, City of Hillsboro
10:05 AM - 10:20 AM BREAK			
10:20 AM - 11:20 AM	Cross Connection and Backflow Protection Certification Overview Molly Keller, OHA	Aeration: Why, How and New O&M Realities (Hr 1) Randy Chann, BioChem Technology	Evacuation Safety and the Role of the Competent Person Hr 2 Eric Fullan, City of Hillsboro
11:25 AM - 12:25 PM	Legionella Control Guidance for Drinking Water Utilities Zoom Presentation Alex Mofidi, Confluence Engineering Group	Aeration: Why, How and New O&M Realities (Hr 2) Randy Chann, BioChem Technology	Evacuation Safety and the Role of the Competent Person Hr 3 Eric Fullan, City of Hillsboro
12:25 PM - 1:00 PM LUNCH			
1:00 PM - 1:30 PM EXHIBITOR TIME			
1:30 PM - 2:30 PM	Control Valves (Hr 1) Steve Causseaus, Cimco GC Systems	Chemical Free Odor and FOG Control Lewis Titus, Titus Industrial Group, Inc	Practical Guide to Leak Water Detection Zoom Presentation Brian Moss, RJM
2:35 PM - 3:35 PM	Control Valves (Hr 2) Steve Causseaus, Cimco GC Systems	Lagoon Management and Solids Reduction Video, but he is available Tanner Hartsock, BioLynceus	Practical Guide to Utility Locating Zoom Presentation Brian Moss, RJM
3:35 PM - 3:50 PM BREAK			
3:50 PM - 4:50 PM	Leak Detection and the Battle against Non-Revenue Water Mike Uthe, Mueller	Low Pressure High Output In-Line UV Disinfection Systems Daniel Chien- Carollo	Risk Assessments for Underground Vaults Frank Ray, EJCO

Wednesday 9/22	Water	Wastewater	Both	Specialty Class
7:30 AM - 8:00 AM	EXHIBITOR TIME			
8:00 AM - 9:00 AM	How to Make Better "Smarter" Pressure Reducing Stations Robert Velasquez, Cimco-GC Systems	Pipe Assessment 101 Zoom Presentation Jim Brown, True North Equipment	Pumping System Troubleshooting for Operators (hour 1) Jason Carman, Rural Community Assistance	Cross Connection Specialist Update Backflow Management
9:05 AM - 10:05 AM	On-Site Sodium Hypochlorite Generation as a Safe and Efficient Alternative to Chlorine Gas Ehan Brooke, UGSI	and Nutrient Removal at 2 WWTFs in Washington Zoom Presentation Eric Smith, RH2	Pumping System Troubleshooting for Operators (hour 2) Jason Carman, Rural Community Assistance	Cross Connection Specialist Update Backflow Management
10:05 AM - 10:20 AM	BREAK			
10:20 AM - 11:20 AM	Pressure Pipes Brandon Mahon/Lucas Stangel, Anderson Perry & Associates	Potential Associated Health Hazards Zoom Presentation Christian James, Oregon OSHA	Pumping System Troubleshooting for Operators (hour 3) Jason Carman, Rural Community Assistance	Cross Connection Specialist Update Backflow Management
11:25 AM - 12:25 PM	Hydraulic Control Valve Training Mike Uthe, Mueller	The Sewer Whisperer: Listen Closely, your Sewer is Talking to You Zoom Presentation Brogan Quist, Smart Cover	Pumping System Troubleshooting for Operators (hour 4) Jason Carman, Rural Community Assistance	Cross Connection Specialist Update Backflow Management
12:25 PM - 1:00 PM	LUNCH			
1:00 PM - 1:30 PM	EXHIBITOR TIME			
1:30 PM - 2:30 PM	AMI Playbook Zoom Presentation Pat Hart, Ferguson	Land-Based Options for Meeting TMDL Challenges Brian Rabe, Cascade Earth Sciences	Pumping System Troubleshooting for Operators (hour 5) Jason Carman, Rural Community Assistance	Cross Connection Specialist Update Backflow Management
2:35 PM - 3:35 PM	THM Mitigation in Water Distribution Systems through Water Storage Tank Mixing and Aeration Ethan Brooke, UGSI	Locating and Reducing Infiltration and Inflow in Collection Systems Zoom Presentation Zach Schrempp, RH2	Pumping System Troubleshooting for Operators (hour 6) Jason Carman, Rural Community Assistance	Cross Connection Specialist Update Backflow Management
3:35 PM - 3:50 PM	BREAK			
3:50 PM - 4:50 PM	Lead and Copper Rule Revision 2021 Amy Word, State of Oregon	Wastewater Operator Certification Basics Paula Carson, DEQ	IoT in the Cloud Rick Patton, Advanced Control	

Thursday 9/23	Water	Wastewater	Both	
7:30 AM - 8:00 AM	EXHIBITOR TIME			
8:00 AM - 9:00 AM	Technology Behind AMR/AMI Kali Kocdemir, Nicor, Inc	Options for Industrial Wastewater Treatment Zoom Presentation Rich Owens, Owens Pump & Equipment	The Science of Water and Wastewater Treatment Polymer Activation Jeff Rhodes, UGSI	
9:05 AM - 10:05 AM	Control Valve Hydraulics, Operation, and Maintenance Robert Velassquez, Cimco-GC Systems	Water Reuse as a Water Management Strategy George Murgel, HECO Engineers	Online pH 101 Zoom Presentation Frank Spevak, Rosemount	
10:05 AM - 10:20 AM	BREAK			
10:20 AM - 11:20 AM	Reagentless Free Chlorine Analysis Zoom Presentation Frank Spevak, Rosemount	Factory of the Future: Next-Generation Controls Randy Chann, BioChem Technology	Air Mitigation in Liquid Conveyance Systems Geoff Robinson, FJ Martin	
11:25 AM - 12:25 PM	Water Quality Improvement through Water Storage Tank Mixing Ethan Brooke, UGSI	Saving Energy and Money through Better Mixing Zoom Presentation Alden Meade, Xylem	Top 5 Mistakes Public Agencies Make When Hiring an Engineer Andy Perry, Anderson Perry & Associates	
12:25 PM - 1:00 PM	LUNCH			
1:00 PM - 1:30 PM	EXHIBITOR TIME			
1:30 PM - 2:30 PM	Checking in on Check Valves; Types and Selection Steve Causseaux, Cimco-GC Systems	What's New in Lagoon Aeration Systems; is there a better way? Lewis Titus, Titus Industrial Group, Inc	Advanced SCADA Cybersecurity for Water Utility Personnel Zoom Presentation James Swanson, RH2/Control Systems NW	
2:35 PM - 3:35 PM	Disinfectant Residual Control in Water Distribution Systems Ethan Brooke, UGSI	What Are You Looking At? Inspection Technology Available for Condition Assessment Zoom Presentation Avery Wilson, CUES SPX	The Fundamentals of Electrochemistry Mark McElroy, Thermo Fisher Scientific	
3:35 PM - 5:00 PM	EXHIBITOR TIME			

2021 AWWA Southern Oregon Subsection Short School Course Descriptions

(W) – Water Certification 2.0 CEUs, plus 0.6 CEUs for Cross Connection Specialty Class

(WW) – Wastewater Certification 2.0 CEUs

(B) – Both Water and Wastewater Certification 2.0 CEUs

WATER

(W): Water Quality Improvement through Water Storage Tank Mixing: *Ethan Brooke, UGSI Solutions.* This 60-minute seminar will provide water system managers, operators and engineers a practical understanding of the science behind applying mixing energy to water in reservoirs or tanks as a means to improve water quality in distribution networks. 0.1 CEU

(W): Disinfectant Residual Control in Water Distribution Systems: *Ethan Brooke, UGSI Solutions.* This 60-minute seminar will provide water system managers, operators and engineers a practical understanding of the conditions, chemistry and science behind affecting positive control of both chloramine and free-chlorine levels in water distribution systems. Importantly, the second half of the seminar will present a suite of proven technologies that can be employed to automatically control disinfectant residual levels in real world water distribution systems. 0.1 CEU

(W): Control Valves: *Steve Causseaux, Cimco-GC Systems.* This presentation will take a fundamental look inside the hydraulically operated, automatic control valve. These are used in many application included, PRV's, pressure relief valves, booster pump control valves, surge valves and many more. Operators will leave with an understanding of how to identify key components and basic troubleshooting/maintenance. 0.2 CEU

(W): Cross Connection and Backflow Protection Certification Overview: *Molly Keller, OHA-DWS.* An overview on what is required for Tester/Specialist certification and how to renew your certification. Including tips and tricks for Specialists and what is up and coming for the DWS certification program. 0.1 CEU

(W): Leak Detection and the Battle Against Non-Revenue Water: *Mike Uthe, Mueller Water Products.* Non-revenue water accounts for 20-30% of an average utilities potable water supply. There have been recent advancements in technology that allow for real time monitoring of pipelines for breaks as well as improved acoustic correlators that allow a utility to locate these leaks before they become catastrophic. I will train the audience on the use of a correlator for leak detection and then explain how this same principle is used for permanent leak monitoring. I will conclude with how we can use this technology for pipeline condition assessments. 0.1 CEU

(W): Real World Considerations for Pump Design, Operation and Troubleshooting: *Steve Truitt, Penn Valley Pump Co.* We will discuss various aspects of pump design which can be used by consulting engineers as well as plant staff. Topics include piping and supports, gauges, switches, suction lift, TDH, NPSH, cavitation and when to use centrifugal versus positive displacement pumps. We will also discuss pump operation and maintenance. Pump troubleshooting will also be covered including tools the plant should have as well as common causes and remedies of pump issues. This information comes from lessons learned during 31+ years of work in the water and wastewater industry. 0.1 CEU

(W): On-Site Sodium Hypochlorite Generation as a Safe and Efficient Alternative to Chlorine Gas or Commercial Strength Bulk Hypochlorite for Water Disinfection: *Ethan Brooke, UGSI Solutions.* This 60-minute seminar will provide water system managers, operators and engineers a practical understanding of the science and implementation behind on-site sodium hypochlorite generation (OSHG) as a source of chlorine disinfection capacity for water and wastewater plants as well as distributed well systems. 0.1 CEU

(W): AMI Playbook: *Pat Hart, Ferguson.* Provide a thorough look into all critical factors to be aware of when selecting a SMART City AMI system. 0.1 CEU

(W): Hydraulic Control Valve Training: *Mike Uthe, Mueller Water Products.* Singer control valves have been manufactured for over 60 years, and were recently purchased by Mueller. Control valves can help provide data about the water system to utilities and diminish non-revenue water. I will discuss the hydraulic fundamentals of

these valves, basics of a pilot system and diverse valve/pilot set up solutions to help control and protect your water system assets. Reviewed in this presentation will be valves ranging from 1/2" to 48", rolling diaphragm for low flow stability, space saving in vaults, and integral back-up valves for critical regions of a water system. Lastly, we will delve into advanced pilot systems, cavitation within valves, choosing the right valve, and common maintenance techniques. 0.1 CEU

(W): THM Mitigation in Water Distribution Systems through Water Storage Tank Mixing and Aeration: *Ethan Brooke, UGSI Solutions.* This 60-minute seminar will provide water system managers, operators and engineers a practical understanding of the conditions, chemistry and science behind trihalomethane (THMs) generation in water distribution systems. Importantly, the second half of the seminar will present a suite of proven technologies that can be employed to reduce THM levels in real world water distribution systems. 0.1 CEU

(W): Lead and Copper Rule Revision 2021: *Amy Word, State of Oregon Drinking Water Services.* This presentation will review the newly released lead and copper rule. There are several components that will directly affect water systems and their operations. The presentation will also compare the current lead and copper rule with the new rule. 0.1 CEU

(W): Reagentless Free Chlorine: *Frank Spevak, Rosemount.* Fundamentals of measurement, technology comparison, troubleshooting techniques, calibration procedures and various installation solutions in Oregon Drinking Water. 0.1 CEU

(W): How to Make Better "Smarter" Pressure Reducing Stations: *Robert Velasquez, Cimco-GC Systems.* This course will cover design, maintenance, and smart technology features to get the most out of control valve stations. Topics include essential elements for pressure reducing stations including pressure reducing and pressure relief control valves, options to increase the lifetime of control valves, options to add smart technology to control valves, and common applications for advanced electronic control valves. 0.1 CEU

(W): Control Valve Hydraulics, Operation, and Maintenance: *Robert Velasquez, Cimco-GC Systems.* This course will discuss the hydraulics, operation, application, and recommended maintenance of automatic diaphragm actuated control valves. 0.1 CEU

(W): Pressure Pipes: *Brandon Mahon & Lucas Stangel, Anderson Perry & Associates.* This presentation will provide an overview of various types, materials and pressure classifications for pipe used in typical municipal systems. Material options for both water and wastewater piping, and applicability will be discussed. Also, how pipe type choices can impact other materials such as fitting, valve and restraint. 0.1 CEU

(W): Technology Behind AMR/AMI: *Kali Kocdemir, Nicor, Inc.* This session will cover the two main types of meter reading technology (cellular and radio)- how they work and detailed pros and cons of each type. It will also cover case stories of how other water utilities improved their radio communication performance at the meter installation site. 0.1 CEU

(W): Legionella Control Guidance for Drinking Water Utilities: *Alex Mofidi, Confluence Engineering Group.* Most recent technical and regulatory-related Legionella control management. This talk will provide utility managers and operators with regulatory knowledge, how to identify Legionella risk in their system and in customer buildings, and how to reduce risk with operations and engineering tools. 0.1 CEU

(W): Checking in on Check Valves: Types and Selection: *Steve Causseaux, Cimco-GC Systems.* This class explains the various styles of check valves available on the market and their applications. We discuss pros and cons of each type including head-loss, slamming, and maintenance. 0.1 CEU

(W): Responses to a Public Safety Power Shutoff (PSPS): *Chris Wanner, Portland Water Bureau.* Presentation will cover what leads up to the calling of a PSPS, how prepared the region was during the September 2020 PSPS for the Salmon River Valley, and the emergency responses that followed. 0.1 CEU

(W): Cross Connection Specialist Update (Specialty Track): *Backflow Management Inc.* This course will enable participants, upon successful completion, to be eligible to renew their Oregon Cross Connection Specialist Certification. Topics include: Backflow Incidents, Regulations, Safety Review, Hydraulics of backflow, design & function, Establishing & maintaining a Cross Connection Program, Legal liabilities, safety, conducting surveys and customer education, and Enforcement Document writing. 0.6 CEU

WASTEWATER

(WW): Modern Lift Station Design: *Simon Cartwright, Xylem.* Today's municipalities are faced with challenges in regards to new lift stations and retrofits that require additional considerations not covered in the Oregon Standards for Design and Construction of Wastewater Pump Stations (May 2001). With new products (flushables) causing ragging issues, reduced operating budgets, green requirements and OH&S issues coming to the fore in many instances; municipalities should consider creating their own strategies to supplement the DEQ guidelines. 0.2 CEU

(WW): Aeration; Why, How, and New O&M Realities: *Randy Chann, BioChem Technology.* Review basics of biological treatment, critical process setpoints, and corresponding requirements for aeration, both mass and residual dissolved oxygen. Compare and contrast operating strategies for BOD removal, nitrification, and nutrient removal. Discuss equipment design and sizing protocols. Review impacts of diurnal loading on process needs and performance. Discuss impacts of equipment condition on operational requirements. Expand on equipment design requirements and criticalness of turndown. Review criticalness of process optimization and equipment operations. Review DIY opportunities for improved BNR performance and optimized operations. 0.2 CEU

(WW): The Sewer Whisperer: Listen Closely, your Sewer is Talking to You: *Brogan Quist, SmartCover Systems.* Reviews how wastewater and water utilities can utilize this patented tech to yield ROI in for their organization, and gain insights on how to become more efficient in their everyday activities. By using satellite communications and ultrasonic tech, this system can be used for SSO prevention, I&I studies, H₂S, and more. 0.1 CEU

(WW): Water Reuse as a Water Management Strategy: *George Murgel, HCO Engineers.* Increasingly stringent wastewater discharge regulation and the cost of wastewater treatment are just two of the many obstacles that rural communities in Idaho struggle within their mission to provide sewer services to citizens. Recycled wastewater provides a viable alternative to discharging treated wastewater to nearby rivers and streams. Treatment costs are an obstacle for purification up to drinking water quality, but the water of lower quality may still be used for irrigation purposes. The use of treated wastewater, especially in applications that are not required to meet drinking water quality, is widely recognized as a proven solution for communities, and alternative recourse from both drought and environmental protection viewpoint. As a result, water reclamation and reuse are being incorporated into sustainable development and integrated water management strategies. 0.1 CEU

(WW): DEQ Wastewater Operator Certification Basics: *Paula Carson, Oregon DEQ.* DEQ Wastewater System Operator Program information: Webpage navigation, review of current application forms, getting certified: new and upgrades, basics on DEQ Wastewater Permits & System Classification, renewals, DEUs, other related organizations, Q & A. 0.1 CEU

(WW): Factory of the Future; Next-Generation Controls: *Randy Chann, BioChem Technology.* Review role of controls in process optimization and automation. Present lessons learned from conventional control solutions and demonstrated performance from next-generation, 4.0, software solutions. Applications focus on aeration automation and emerging process optimization solutions (ammonia based aerations control). 0.1 CEU

(WW): Lagoon Management and Solids Reduction: *Tanner Hartsock, BioLynceus.* Wastewater operators will learn how to effectively manage their lagoons in a world of increasing regulations. The presentation will introduce lagoons in a way that new operators can understand. There will be an emphasis on how to best manage pretreatment ordinances to avoid operational challenges, as well a workshop to help operators better understand and manage their biosolids. 0.1 CEU

(WW): Pipe Assessment 101: *Jim Brown, True North Equipment.* This class discusses some of the history of sanitary sewer, reasons for inspection and assessment, and methods and terminology used in CCTV inspection as well as a brief discussion into NASSCO and PACP assessment. 0.1 CEU

(WW): What Are You Looking At? Inspection Technology Available for Condition Assessment: *Avery Wilson, CUES SPX.* Video inspection options from investigative, up to full condition assessment of pipe line structure. 0.1 CEU

(WW): Saving Energy and Money through Better Mixing: *Alden Meade, Xylem/Flygt.* New mixing technology and how best to apply proper mixing techniques and technologies to benefit WWTP mixing and costs savings associated with energy reduction and proper mixing. 0.1 CEU

(WW): Options for Industrial Wastewater Treatment: *Rich Owens, Owens Pump & Equipment.* What are the current and future possible options for industrial wastewater treatment? We will describe what is currently being used, what advantages they have, and their disadvantages. There will also be discussion on upcoming technologies that could replace the current technology. 0.1 CEU

(WW): Excavations, Trenching, Soil Mechanics & Potential Associated Health Hazards: *Christian James, Oregon OSHA.* Presentation on excavations, trenching, soil mechanics and associated health hazards for field operators. 0.1 CEU

(WW): What's New in Lagoon Aeration Systems; is there a better way? *Lewis Titus, Titus Industrial Group.* We will review current methods of Lagoon management, and take a look at some new technology. Reducing energy costs, maintenance costs, sludge, odors, algae, and maintaining proper DO levels. 0.1 CEU

(WW): Chemical Free Odor and FOG Control: *Lewis Titus, Titus Industrial Group.* This class will detail methods for treating Fats, Oils, and Greases (FOG) and elimination odors in your sewer system without the use of costly chemicals. Reducing maintenance costs around 90% while keeping the neighbors happy, ending the odor complaints. An added bonus of virtual elimination of ragging issues at your pump station. 0.1 CEU

(WW): Experience With Densified Mixed Liquor And Nutrient Removal At Two WWTFs In Washington: *Eric Smith, RH2 Engineering.* This presentation will highlight recent operational experience with two wastewater treatment plants discharging to the Wenatchee River. The plants include a densified mixed liquor which provides high treatment capacity relative to plant footprint as well as exceptional biological nutrient removal. 0.1 CEU

(WW): Locating and Reducing Infiltration and Inflow in Collection Systems: *Zach Schrempp, RH2 Engineering.* Educating operators and engineers on methods of locating I/I and prioritizing the rehab projects that will achieve the greatest I/I reduction. 0.1 CEU

(WW): Low Pressure High Output In-Line UV Disinfection Systems: *Daniel Chien, Carollo Engineers, Inc.* This class will discuss trend towards Low Pressure High Output (LPHO) in-line and review two recent design projects implementing LPHO UV reactors. 0.1 CEU

(WW): Land-Based Options for Meeting TMDL Challenges: *Brian Rabe, Cascade Earth Sciences.* Surface water discharge requirements are becoming increasingly stringent over time. Total Maximum Daily Loads (TMDL's) guide these requirements. Land-based treatment and reuse options are one way to meet these requirements through partial or total diversion of discharges to storage and/or land application for beneficial use of the water and nutrients. 0.1 CEU

BOTH: WATER/WASTEWATER

(B): Risk Assessment of Underground Vaults: *Frank Ray, EJ.* This presentation is an informative tutorial. The course will teach the important facts of OSHA Standards when applied to underground utility vaults. At the conclusion of the course, the student will be better equipped to make informed specification decisions as it relates to infrastructure access coverings and ladders used for underground utility vaults. 0.1 CEU

(B): Excavation Safety and the Roll of the Competent Person 3 hours: *Eric Fullan, City of Hillsboro.* Overview of OSHA excavation standard with an emphasis on the Competent Person requirements that include identifying existing and predictable hazards, soil analysis and protective systems. 0.3 CEU

(B): The Science of Water and Wastewater Treatment Polymer Activation: *Jeff Rhodes, UGSI Solutions.* This 60-minute seminar will provide water system managers, operators and engineers a practical understanding of the science behind polymer and polymer activation as well as the techniques used to optimize the use of polymer in plant settings. 0.1 CEU

(B): Air Mitigation in Liquid Conveyance Systems: *Geoff Robinson, Frank J Martin Co.* Participants will understand how entrained air accumulates in systems, as well as understand pipeline behavior during random air intrusion and catastrophic emptying. Participants will be able to associate and recognize common corrosion damage as well as cross-contamination events as air-related phenomena and begin to master management of efficient air mitigation programs. Participants will be able to choose and size air valve types for specific applications. 0.1 CEU

(B): Practical Guide to Utility Locating Water and Sewer: *Brian Moss, RJM Equipment Sales.* Choosing the best frequencies, checking and improving accuracy, locator calibration, check, determining depth accuracy, improving signal strength, selecting the best antennas, and other information to give the operator the ability to locate utilities more accurately with confidence. 0.1 CEU

(B): Pumping System Troubleshooting for Operators 6 hours: *Jason Carman, Rural Community Assistance Corporation.* The attendees will learn basic pump performance testing and troubleshooting techniques. We will go over the main types of pumps used in water and wastewater systems, discuss their performance characteristics and how to troubleshoot these pumps and their related infrastructure. Attendees will learn about Lock Out, Tag Out (LOTO) safety procedures along with general employee safety when working in close proximity to exposed rotating elements. 0.6 CEU

(B): Practical Guide to Leak Water Detection: *Brian Moss, RJM Equipment Sales.* Compare actual leak sounds, leak detection steps, helpful tips, solutions for surveying, logging, correlating, tracer gas, and water leak pinpointing. 0.1 CEU

(B): IoT in the Cloud: *Rick Patton, Advanced Control Systems.* The world is becoming ever increasingly connected. High speed connectivity has arguably had the most significant impact on our world during the last decade. Cellular has led the way. Satellite is around the corner. We've gone from 3G to 4G LTE and next is 5G and goes on and on. But we need "things" to connect between. So the term "Internet of Things," abbreviated IoT, was born. While the ability to monitor and control home security, temperature and lighting from your cell phone are examples, what this class addresses is what these technologies lend and how we can leverage them to serve the water and wastewater industry - now and in the future. 0.1 CEU

(B): Online pH 101: *Frank Spevak, Rosemount.* Explain the relationship between glass and reference electrodes, effects of temperature, calibration procedures, troubleshooting practices and maintenance. 0.1 CEU

(B): The Fundamentals of Electrochemistry: *Mark McElroy, Thermo Fisher Scientific.* This is a practical look at tasks that are performed every day in the lab and in the plant. These functional tasks are often misunderstood and not performed properly. There will also be a detailed conversation about how things work and how to best troubleshoot. We will also discuss proper care and maintenance. 0.1 CEU

(B): Top 5 Mistakes Public Agencies Make When Hiring an Engineer: *Andy Perry, Anderson Perry & Associates.* This presentation will review common mistakes that public agencies make when firing an engineer. Items discussed will include developing a good RFP, the pitfalls of asking for price, how to define a good scope, and league requirements often overlooked. 0.1 CEU

(B): Developing Operator Decision Making Skills for Emergency: *Mark Walter, Waterdude Solutions.* In order to protect the environment and work safely under all conditions requires a measured approach to decision making. This training will highlight various decision-making concepts and how they apply to the operation and maintenance of wastewater systems. Attendees will be introduced to the OODA decision making method to accelerate decision making, particularly in emergency situations. 0.1 CEU

(B): Advanced SCADA Cybersecurity for Water Utility Personnel: *James Swanson, RH2.* Educating water utility staff on practical cybersecurity concepts for SCADA networks. 0.1 CEU