



June 18-21, 2024  
Oklahoma City, Oklahoma



[wef.org/ResidualsBiosolids](http://wef.org/ResidualsBiosolids)

## **WEF Residuals and Biosolids Conference 2024**

**June 18-21, 2024**

**Oklahoma City Convention Center,  
Oklahoma City, OK**

**Technical Program**

*(updated April 4, 2024)*

## **Pre-conference Workshops**

*Additional fees apply*

### **Workshop A: Upgrading Biogas to Renewable Natural Gas**

**Tuesday, June 18**

**8:30 AM – 5:00 PM**

**Speakers:** Silvia Fuentes, Washington Suburban Sanitation Commission; Jeff Prevatt, Pima County RWRD; Erika Bailey, Raleigh Water

This hands-on workshop provides a comprehensive review of the many intricacies involved in upgrading of biogas to RNG standards for pipeline injection and ultimate distribution and sale of renewable identification number (RIN) credits.

A list of interactive topics covered including:

- EPA registration process for becoming a RIN generator
- Utility agreements between the WRF RNG entity and interstate gas transmission providers
- Monetization of RNG
- RNG system operation

A full agenda for this workshop is coming soon!

## **Pre-conference Workshops**

*Additional fees apply*

### **Workshop B: Dewatering Optimization – Practical Ways to Improve Performance**

**Tuesday, June 18**

**8:30 AM – 5:00 PM**

**Speakers:** Matthew Higgins, Bucknell University; Adam Parmenter, HDR; Josh Miner, Carollo; Jeffrey Nicholson, HRSD; Charles Goss, AECOM; Luke Plache, VeloDyne Systems; Zwelani Ngwenya, Jacobs; Stephanie Spalding, HDR; David Oerke, Jacobs

The Dewatering Optimization – Practical Ways to Improve Performance workshop will focus on practical solutions to improve dewatering performance including drier cake solids, better solids capture, reduced polymer consumption, and reduced O&M costs for raw sludge, aerobically and anaerobically digested biosolids. This workshop will be of primary interest to plant managers, superintendents, operators and maintenance staff from municipalities. Furthermore, this workshop topic is critical and timely to the industry since municipalities are getting more and more pressure to reduce their budgets or to "do more for less" in addition to addressing the challenges of increasing polymer, solids processing and hauling cost.

The information from the workshop will provide municipal attendees the knowledge and resources to better perform their jobs with lower O&M costs, will help consultants to provide more informative and better dewatering equipment advice and will help manufacturers to provide better and more optimum machine performance at lower O&M costs.

A full agenda for this workshop is coming soon!

## **Pre-conference Workshops**

*Additional fees apply*

### **Workshop C: A Cradle-to-Cradle Approach to Fugitive Methane Quantification and Abatement**

**Tuesday, June 18**

**8:30 AM – 5:00 PM**

**Speakers:** David Ponder, Brown and Caldwell; Trung Le, Brown and Caldwell; Dante Fiorino; Jason Ren, Princeton University; Elsayed Elbeshbishy, Toronto Metropolitan University; Tyler Schweinfurth, City of Columbus; Douglas Dixon, City of Columbus

This workshop is designed to help participants develop an understanding of the drivers, risks, and regulations that influence fugitive methane abatement in the United States. They will also learn about emerging and available technologies for quantification in the market and the use of those technologies for quantification through multiple US case studies and develop an understanding of abatement solutions and strategic implementation of these solutions through a case study.

This workshop will cover the following topics:

- State of Fugitive Methane
- Drivers, Risks, and Regulations for Fugitive Methane
- Emerging and Available Quantification Technologies
- Practical Case Studies

A full agenda for this workshop is coming soon!

**Opening General Session**  
**Wednesday, June 19**  
**8:30 AM - 10:00 AM**

More information about the Opening General Session is coming soon!

**Poster Presentations**

**Wednesday, June 19, 10:00 AM – 6:15 PM**

**Thursday, June 20, 10:00 AM – 3:45 PM**

The following poster presentations will be set up for viewing in the exhibit hall during hall hours:

**Individualized Economic Analysis of Hydrothermal Liquefaction for Wastewater Decarbonization**

Michael Timko, Julian Bennett, Muntasir Shahabuddin, Andrew Texeira, Nikolaos Kazantzis, Worcester Polytechnic Institute; Julia Faeth, RAPID Manufacturing Institute; Aidin Panahi, Andrew Charlebois, Alex Maag, Harold Walker, Worcester Polytechnic Institute

**Leveraging Alum Sludge for Beneficial Reuse: An Exploration of Contaminant Removal Mechanisms**

Dane Elliott, Ohio State University

**Recovery of heavy metals from electronic industry waste sludge by bioleaching process**

Shen-Yi Chen, Tzu-Jung Yen, National Kaohsiung University of Science and Technology

**Session 01: Research and Innovation**

**Wednesday, June 19**

**10:45 AM - 11:45 AM**

**10:45 AM**      **Initial Results from PFAS Destruction Testing in Ultra High Temperature Ionic Gasification**

Brandon Davis, Heartland Water Technology

**11:15 AM**      **Cleaning up after the pandemic: How old and new quaternary ammonium compounds affect anaerobic digestion**

Zihao Lu, Marquette University; William Arnold; Daniel Zitomer, Christopher Marshall, Marquette University; Anna Mahony, University of MN; Patrick McNamara

**11:45 AM**      **Session Adjourns for Luncheon**

**Session 02: RBC Young Professional Panel Discussion**  
**Wednesday, June 19**  
**10:45 AM - 11:45 AM**

This session will feature a 60-min “Reverse Panel”, where the following topics will be discussed:

- Developing a Resource Network,
- Professional Development and Career Guidance,
- Career Pathways in the Water Industry.

More information about this session is coming soon!



**Session 03: State of the Solids Stream: Running a 100% Beneficial Reuse  
Biosolids Program at the City of Columbus, Ohio  
Wednesday, June 19  
10:45 AM - 11:45 AM**

**Speakers:** Annaka Ruther; Moss Birri, City of Columbus

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

A full agenda for this session is coming soon!

**Session 04: The Fate of PFAS in Biosolids through Land Application, Incineration, and Thermal Treatment - Updates from Water Research Foundation Projects**  
**Wednesday, June 19**  
**10:45 AM - 11:45 AM**

**Speakers:** Linda Lee, Purdue University; Lloyd Winchell; Patrick McNamara, Marquette University; Lynne Moss, Black and Veatch

Per- and Polyfluoroalkyl Substances (PFAS) have dramatically shifted the biosolids management landscape, with one state already passing a ban on land application due to PFAS in biosolids. Thus, there is a great research need to understand the fate of PFAS through land application of biosolids, incineration, and emerging thermal treatment technologies including pyrolysis and gasification. Therefore, the Water Research Foundation (WRF) has supported this important research need. This session will highlight findings from three WRF projects that focus on the fate of PFAS in biosolids: 5214 Direct In Situ Measurement of PFAS Transformation & Leaching from Land-Applied Biosolids, 5111 Studying the Fate of PFAS through Sewage Sludge Incinerators, 5211 Understanding the Value Proposition for Thermal Processes to Mitigate PFAS in Biosolids.

A full agenda for this session is coming soon!

**Technology Spotlight I**  
**Wednesday, June 19**  
**12:45 p.m. – 1:10 p.m.**

*The two exhibitors listed below will each hold a 20-minute presentation once each. Participants are invited to attend a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kick off concurrently at: **12:50 p.m.** in each of the two booths.*

12:45 p.m. Mobile Session Introduction at entrance to exhibit hall  
12:50 p.m. 2 Simultaneous Presentation A

**Booth 729**     **Double your Cake solids in under 2 Minutes. A Performance Review of Elode Drying Technology**  
Devry Faddis, Charter Machine Company

**Booth 802**     **The City of Marengo, IL Utilizes the Cleanb® to Significantly Improve Operation and Throughput Capacity**  
Lance Rodeman, BCR Environmental

**Session 05: Dewatering**  
**Wednesday, June 19**  
**1:30 PM - 4:45 PM**

- 1:30 PM**      **Dewatering Benefits of SLG Technology at the McDowell Creek Wastewater Treatment Plant**  
Kathryn Quaid; [Anish Luthra](#); Muriel Steele
- 2:00 PM**      **Application of Measured Rheological Data for Improved Sludge Process Design**  
Elaine Leonard; [Luke Thompson](#), HDR, Inc.
- 2:30 PM**      **Knock Out, Drag Out Fight: Centrifuge vs. Belt Filter Press — Title for Best Dewatering Technology to Squeeze the Poop at William. E. Dunn Water Reclamation Facility!**  
[Manuel Moncholi](#), Stantec; [Shyam Sivaprasad](#); Jeovanni Ayala-Lugo, Simon Meikle, Stantec; Dean Lyons, Thomas Menke, Pinellas County Utilities
- 3:00 PM**      **Networking and Coffee Break**
- 3:45 PM**      **Taking a Late Phase Detour: Dewatering System Redesign for the Plum Island WPCP**  
Ruth Borgmann, [Jacqueline Yeh](#), C Bullard, Hazen and Sawyer; Jared Hartwig; Jonathan Walker, Gregory Hider, Charleston Water System
- 4:15 PM**      **From Drying Beds to Screw Presses — Impact of BNR on Dewatering and Managing Recycled Phosphorus in Salt Lake City**  
[Brock Hodgson](#), Grant Davies, C. Goss, AECOM; Michelle Barry; Jamey West, Salt Lake City Department of Public Utilities; Jose Rubalcaba, Salt Lake City Corp
- 4:45 PM**      **Session Adjourns for Networking Reception in Exhibit Hall**
- Alternate**      **Enhancing post-treatment efficiency of temperature phased anaerobic digestate through combined chemical conditioning for Class A Biosolids production**  
Ahmed Alsayed, Northwestern University; [Umme Sharmeen Hyder](#), Elsayed Elbeshbishy, Joseph McPhee, Reshmi Misir, Toronto Metropolitan University

## **Session 06: Resource Recovery and Sustainable Practices**

**Wednesday, June 19**

**1:30 PM - 4:45 PM**

- 1:30 PM**      **Partnering with Local Sources of High Strength Wastes through a Co-digestion Program**  
Kevin Wegener, Ornella Sosa-Hernandez, Peter Schauer, Clean Water Services
- 2:00 PM**      **Integrated Biosolids and Organics Management Strategy in the City of Windsor, Ontario, Canada**  
Eduardo Valdez, City of Windsor; Christina Jung, Jian Li; Drury Whitlock, Stantec
- 2:30 PM**      **Setting the Path for Resource Recovery at Iona Island with a 2100 Vision in Mind**  
C. Goss, AECOM; Marek Ratajczak, Metro Vancouver; Joyce Chang, Jacobs; Richard Bitcon; Kim Fries
- 3:00 PM**      **Networking and Coffee Break**
- 3:45 PM**      **Optimizing Recovery and End Use of Gypsum in Super-Saturated RO Concentrate at PRWC Southeast Water Production Facility**  
Christian Karavangelos; Brandon Yallaly, Mary Thomas, Carollo Engineers, Inc.; Eric DeHaven, Polk Regional Water Cooperative; Mark Addison, Polk County Utilities
- 4:15 PM**      **Biosolids Land Application; A focus on Phosphorus. Are we applying too much?**  
Bernadette Drouhard, Black & Veatch; Sarah Guzman; Mark Lang; Vickie Hoge, St. Johns River Water Management District
- 4:45 PM**      **Session Adjourns for Networking Reception in Exhibit Hall**
- Alternate**      **Feasibility Study for the Implementation of Hydrothermal Liquefaction in Southeast Michigan: Considering Environmental, Economic, and Social Aspects**  
Michael Thorson, Pacific Northwest National Laboratory; Xavier Fonoll Almansa, University of Texas at Austin; John Norton, Great Lakes Water Authority; Glen Daigger; John Willis, Brown and Caldwell; Shuyun Li, Pacific Northwest National Laboratory; Carol Miller, Wayne State University; Yuan Jiang, Pacific Northwest National Laboratory; Timothy Seiple; Andrew Marcus, Great Lakes Water Authority; Uriah Kilgore, Pacific Northwest National Laboratory

**Session 07: Outreach Updates: From State to Regional Solutions**  
**Wednesday, June 19**  
**1:30 PM - 3:00 PM**

- 1:30 PM**      **Advocacy & Outreach in Biosolids Management**  
Megan Ross, SediVision, LLC
- 2:00 PM**      **Working towards a sustainable outlet for Maine Biosolids through a Regional Solution**  
Scott Firmin, Portland Water District; Tracy Chouinard; Natalie Sierra, John Ross, Brown and Caldwell
- 2:30 PM**      **JEA's Measured Approach to Regional Biosolids Management with Drying: Setting a Trend for Utilities Concerned about Narrowing Management Options**  
Peter Blackley, Jacksonville Energy Authority (JEA); Sudhan Paranjape, Carollo Engineers Inc.
- 3:00 PM**      **Session Adjourns for Networking and Coffee Break**
- Alternate**      **Residuals and Biosolids Master Planning at WSSC Water Innovative solutions and collaboration pave the way for effective Master Plan development.**  
Malcolm Taylor

**Session 08: Resurgence of Sub-and Supercritical Wet Oxidation Technologies for Eliminating PFAS in Biosolids and Residuals with a Reduced Carbon Footprint**  
**Wednesday, June 19**  
**1:30 PM - 4:45 PM**

**Speakers:** Naomi Senehi, 374Water; Marc Deshusses, Duke University; Michael Thorson, Pacific Northwest National Laboratory; Braden Crowe, MicroBio Engineering; Pooja Sinha, Stantec; Jeremy Taylor, SoMax Circular Solutions; Sudhakar Viswanathan, 374Water

In this session participants learn the fundamentals of sub-and supercritical wet/wet air oxidation (WAO) technologies including hydrothermal carbonization (HTC), hydrothermal liquefaction (HTL), and supercritical water oxidation (SCWO). These concepts will be tied into how WAO technologies can efficiently treat biosolids and residuals, with the potential of these technologies to destroy per-and polyfluoroalkyl substances (PFAS). Participants will conceptualize the energy balances of each technology to understand how WAO technologies can operate in a net-energy positive manner to offset GHG emissions associated with traditional biosolids and residuals management.

A full agenda for this session is coming soon!

**Technology Spotlight II**  
**Wednesday, June 19**  
**3:15 p.m. – 3:40 p.m.**

*The two exhibitors listed below will each hold a 20-minute presentation once each. Participants are invited to attend a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kick off concurrently at: **3:20 p.m.** in each of the two booths.*

3:15 p.m.      Mobile Session Introduction at entrance to exhibit hall  
3:20 p.m.      2 Simultaneous Presentation A

**Booth 519      Understanding Dryer Energy Requirements Within High Temperature Thermal Processes**  
Chip Pless, LCI Corporation

**Booth 713      Dewatering Co-digested Biosolids and Source-separated organics; Challenge and Success.**  
Scott McKay, SMK Consulting in Fournier Booth



**Session 09: Emerging Issues**  
**Wednesday, June 19**  
**3:45 PM - 4:45 PM**

- 3:45 PM**      **Harmonizing Thermal Hydrolysis Pretreatment: Digestibility, Dewaterability, and Microbial Symphony in PFAS-Laden Sewage Sludge**  
Abir Hamze, Toronto Metropolitan University (TMU); Basem Reda, University of Alberta; Mohamed Zaghoul, Toronto Metropolitan University; Bipro Dhar; Elsayed Elbeshbishy, Toronto Metropolitan University
- 4:15 PM**      **Microplastics in Solids Stream: Abundance, Fate and Methodologies for Analysis**  
Cayla Cook, Carollo Engineers; Yian Sun; Derya Dursun, Hazen and Sawyer; Mohammad Abu-Orf
- 4:45 PM**      **Session Adjourns for Networking Reception in Exhibit Hall**
- Alternate**      **Microplastics: The Next Contaminant of Emerging Concern**  
Kaitlyn Haque

## **Facility Tour**

*Additional fees apply*

### **Tour A: Modern Composting in Midwest City**

**Thursday, June 20**

**8:00 AM – 11:00 AM**

Midwest City has successfully performed fully automated composting at their Northside Water Resources Recovery Facility since 2015. The City's Compost Facility at the WRRF uses a highly controlled in-vessel stabilization process, including a rail mounted turner/advancing machine, located within an industrial football field size building. The system utilizes automated temperature monitoring, control, and tracking to achieve a Class A product. Anaerobically digested and dewatered biosolids generated at the WRRF are blended with local yard waste in carefully designed ratios. Composting is accomplished without producing objectionable odors. Altogether, Midwest City sustainably recycles nutrients within the local community while diverting yard waste otherwise destined for disposal at the local landfill. The City sells out every batch of compost with waiting lists for the next batch. Conference attendees are invited to come and see modern composting in action.

**Session 10: Thickening**  
**Thursday, June 20**  
**8:30 AM - 10:00 AM**

- 8:30 AM**      **Suspended Air Flotation (SAF) Thickening — Suitability and Key Performance Drivers in Primary and Blended Solids Thickening Applications**  
Crystal Harness; [Caitlin Ruff](#), Black & Veatch; Cody Manley, John Bennett, Trinity River Authority of Texas; Eric Redmond
- 9:00 AM**      **Thickening - Simple Process, Mixed Results**  
BJ Ward, [Mario Benisch](#), HDR
- 9:30 AM**      **The increase in biogas production and other benefits resulting from SLG-F advanced sludge thickening and sludge conditioning prior to anaerobic digestion at Worcester STW: Results from Severn Trent Water & Orege**  
Clementine Justier, Orege North America; [Hannah Belcher](#), Severn Trent; Matthew Gibson, Orege
- 10:00 AM**      **Session Adjourns for Networking and Coffee Break**
- Alternate**      **Getting Our Poop in a Group: A Biosolids Regionalization Study in New England**  
Eric Spargimino, CDM Smith; [Vanessa Borkowski](#); Karla Sangrey, Upper Blackstone Clean Water; James McCaughey, Narragansett Bay Commission; Joshua Schimmel, Springfield Water & Sewer Commission; Drury Whitlock, Stantec

**Session 11: Greenhouse Gas Emissions at Wastewater Treatment Plants**  
**Thursday, June 20**  
**8:30 AM - 11:45 AM**

- 8:30 AM**      **Assessing Nitrous Oxide Emissions from a Demonstration-Scale Membrane Bioreactor Process**  
Bruce Mansell, Los Angeles County Sanitation Districts; [Ruth Spierling](#);  
Raymond Tsai, Ariana Coracero, Los Angeles County Sanitation Districts; Joyce Lehman, Kiersten Melville, Metropolitan Water District of Southern California;  
Alan Ronn
- 9:00 AM**      **Reduction of Nitrous Oxide Emissions from Biological Nutrient Removal Processes by Thermal Decomposition**  
[Philip Pedros](#), Mott MacDonald; Hameed Metgalchi, Northeastern University;  
Omid Askari, West Virginia University
- 9:30 AM**      **Evaluating the Sustainability Impacts of Replacing Multiple Hearth Furnaces with High Temperature Fluidized Bed Incinerators and PFAS Regulation Implications on Process Design**  
Michael Theodoulou, [Gwyneth Jordan](#), Veolia Water Technologies & Solutions
- 10:00 AM**      **Networking and Coffee Break**
- 10:45 AM**      **Next Generation Digestion for the Fugitive Methane Era**  
Dante Fiorino, Brown and Caldwell; [Tom Nangle](#); Tyler Schweinfurth, City of Columbus
- 11:15 AM**      **The influence of methane on sludge processing and its carbon footprint**  
[William Barber](#)
- 11:45 AM**      **Session Adjourns for Luncheon**
- Alternate**      **Biosolids planning for an uncertain future — How regulatory drivers and technology developments are influencing long-term infrastructure decisions.**  
Eric Auerbach; [Pranoti Kikale](#), Arcadis U.S., Inc.; Andy McClure, City of Toledo

**Session 12: Advancing Anaerobic Digestion**  
**Thursday, June 20**  
**8:30 AM - 11:45 AM**

- 8:30 AM**      **A Regional Resource Recovery Facility Enhances Pinellas County's Approach to Biosolids and Organic Wastes Management Circularity**  
Gunner Mitchell, Pinellas County; [Richard Tsang](#), CDM Smith
- 9:00 AM**      **Comparing conventional anaerobic digestion with an innovative plug-flow digestion technology in North America**  
Andre Visser; Danny Traksel, Eddie Koornneef, Royal HaskoningDHV; [Wayne Parker](#), University of Waterloo
- 9:30 AM**      **Scalability of Anaerobic Digestion: evaluating pilot scale operations for full-scale implementation for Metro Vancouver's advanced digestion concepts**  
Parisa Chegounian, Metro Vancouver; [Christopher Muller](#), Farokh Kakar, Brown & Caldwell; Michael Yesin, WSP; Lillian Zarembo, Metro Vancouver; Tyler Barber
- 10:00 AM**      **Networking and Coffee Break**
- 10:45 AM**      **Going the Extra Mile in Evaluating Digester Mixing Technologies for Existing Digesters**  
Rashi Gupta; [Xiaolun Guo](#)
- 11:15 AM**      **How does scheduled maintenance affect the digester supervision through modeling? A practical approach**  
Constanza Sadino, [Andres Donoso-Bravo](#), Fernando Zorrilla, Modela; Bastian Valdebenito, Felipe Hansen, ProCycla
- 11:45 AM**      **Session Adjourns for Luncheon**

**Alternate**

## **Session 13: Thermal Hydrolysis Process**

**Thursday, June 20**

**8:30 AM - 10:00 AM**

- 8:30 AM**      **Challenges of Simulating THP for a “Real” World Full-Scale Application. Are our commercial simulators giving the right message?**  
Thomas Tom Johnson, Adrian Romero, Jacobs; Blake Anderson, Kansas City Water; Julian Sandino, Jacobs
- 9:00 AM**      **Co-digestion and thermally hydrolyzed food waste and waste activated sludge**  
Amr Ismail, Toronto Metropolitan University; Farokh Kakar, Brown & Caldwell; Elsayed Elbeshbishy, Toronto Metropolitan University; George Nakhla, University of Western Ontario
- 9:30 AM**      **Growing Up Together Lessons Learned During Startup: Commissioning Sidestream Deammonification Concurrent with THP Digestion to Meet Strict Recycle Limits**  
Matthew Vanhorne, Hazen and Sawyer; Paul Le Bel; Robert Wierzbicki; Joseph Uglevich
- 10:00 AM**      **Session Adjourns for Networking and Coffee Break**
- Alternate**      **Alternate: Chemical and Hyper-thermal post treatment of Anaerobically Digested Cattle Manure for Enhanced Biogas Production**  
Basem Haroun, Mohamed El-Qelish, Western University; Farokh Laqa Kakar; Seyedehfatemeh Kianizadeh, Western University; Christopher Muller, Brown and Caldwell; Katherine Bell, Brown and Caldwell; George Nakhla, University of Western Ontario

**Technology Spotlight III**  
**Thursday, June 20**  
**10:15 a.m. - 10:40 a.m.**

*The two exhibitors listed below will each hold a 20-minute presentation once each. Participants are invited to attend a different presentation at each of the times listed below. Choose the presentation you would like to attend. Each presentation happens at the exhibitor's booth. Presentations kick off concurrently at: **10:20 a.m.** in each of the two booths.*

10:15 a.m.      Mobile Session Introduction at entrance to exhibit hall  
10:20 a.m.      2 Simultaneous Presentation A

**Booth 604      PRI-TECH®: a chemical pill for biosolids headaches - case studies in peroxide regenerated iron for biosolids applications**  
Ian Watson, USP Technologies

**Booth 907      Can (supercritical) water be the solution to our PFAS problem?**  
Sudhakar Viswanathan, 374 Water

## **Session 14: Benefits and Approaches to Moving Dewatering into the Modeling Realm**

**Thursday, June 20**

**10:45 AM - 11:45 AM**

**Speakers:** Matthew Higgins; David Oerke, Jacobs Engineering; George Sprouse, Metropolitan Council Environ Serv; Zwelani Ngwenya, Jacobs Engineering

Modeling of wastewater treatment processes has advanced significantly in the last 10 years to include numerous different configurations on the liquid side including biochemical oxygen demand, total suspended solids and nutrient removal, membrane systems, and fixed film systems as well as whole plant simulation models that include solids treatment/stabilization such as anaerobic digestion including thermal hydrolysis pretreatment. Based on a WRF funded project and related research, data and approaches were developed to extend these whole plant models to include dewatering to estimate cake solids concentration and estimate the solids to be trucked for beneficial land application and landfilling, or to size downstream solids treatment processes, such as thermal drying and combustion. Being able to predict dewaterability and polymer dose has numerous benefits because the performance of dewatering has a significant impact on the overall economics of the solids treatment processes, and the entire Water Resource Recovery Facility's operational and capital costs. Figure 1 shows a whole plant model from SUMO that includes a final dewatering unit. As a result, understanding the impact of a change in an upstream liquid treatment and solids process on downstream dewatering would help utilities better plan and estimate the full costs of these upstream process changes.

A full agenda for this session is coming soon!



**Session 15: Dryer**  
**Thursday, June 20**  
**10:45 AM - 11:45 AM**

- 10:45 AM**      **PFAS Assessment of a Rotary Drum Dryer**  
John Ross, Brown and Caldwell; Donald Song
- 11:15 AM**      **Tipping Fees Reach the Tipping Point: The Why, What, and How of the  
Summerville CPW Biosolids Upgrade Project**  
Micah Miley, Summerville CPW; Thomas Vollmar, KCI Technologies; Anthony  
Taylor, Harper General Contractors, Environmental Systems Division
- 11:45 AM**      **Session Adjourns for Luncheon**
- Alternate**      **Thermal Treatment of PFAS with Gasification, Pyrolysis, Incineration, and  
Supercritical Water Oxidation (SCWO) - What is the Current Status?**  
Levent Takmaz, Veolia; Lloyd Winchell

## **Facility Tour**

*Additional fees apply*

### **Tour B: City of Edmond-Aerobic Digestion and Dewatering Facility Tour**

**Thursday, June 20**

**1:00 PM – 4:00 PM**

The City of Edmond's Coffee Creek Water Resource Recovery Plant (CCWRRF) includes preliminary treatment (screening/grit removal), secondary treatment (aeration basins and clarifiers), tertiary treatment (filtration/disinfection), and solids stabilization (sludge lagoons). CCWRRF has been the process of Phase 1 of an expansion and improvements project that includes improvements to the liquid treatment and solids processing facilities that will increase the AAF capacity to 10 mgd and meet the new regulatory limit on nitrate. Modifications include new external anoxic zones and a mixed liquor recycle system to operate the secondary treatment facility with a Modified Ludzack-Ettinger process. The Phase 1 Expansion is anticipated to be completed in 2024 but several elements are already in operation including modifications to the solids processing facilities. The Phase 1 Expansion improvements will decommission the sludge lagoons and replace them with a new train that includes sludge screening, sludge thickening, aerobic digestion, sludge dewatering, and cake storage.

## **Session 16: Nutrient Considerations and Digestion**

**Thursday, June 20**

**1:30 PM - 3:00 PM**

- 1:30 PM      Phosphorus Sequestration in Biosolids, Nuisance Struvite Control via PAD and Chemical Addition to TH-AD Digestate, and Downstream Effects**  
Caitlyn Harris, HRSD; Maya Garcia; Dana Gonzalez, Christopher Wilson, Arba Williamson, Jeffrey Nicholson; Charles Bott, HRSD
- 2:00 PM      Significance of Process Control Strategy in Dynamic Modeling and Optimization of Full-Scale Post Aerobic Digestion (PAD)**  
Sara Arabi, Mehran Andalib, Stantec; Cole Sigmon, Christopher Marks, City of Boulder
- 2:30 PM      Anaerobic Digestion with Nutrient Control - What if your Digesters were the Sidestream?**  
Matthew Williams, Thermal Process Systems; Justin Wippo
- 3:00 PM      Session Adjourns for Networking and Coffee Break**
- Alternate      Solids processing improvements help utility to achieve nutrient reduction and biosolids goals**  
Toshio Shimada, Corinne Duckworth, Carollo

**Session 17: Land Application**  
**Thursday, June 20**  
**1:30 PM - 3:00 PM**

- 1:30 PM**      **Evaluation of Innovative Biosolids Management Strategies with Considerations of Circular Water Economy**  
Derya Dursun, Hazen and Sawyer; [Yian Sun](#); Asa Lewis, Hazen and Sawyer; Christian Evans, Sylvis; Mark Teshima; Micah Blate; Mohammad Abu-Orf
- 2:00 PM**      **Sewage Sludge Incinerator Ash as a Phosphorus Fertilizer for Corn and Soybean**  
Carl Rosen, University of Minnesota; [Persephone Ma](#)
- 2:30 PM**      **Harnessing biosolids to reclaim mine lands: Case studies from Appalachia**  
Ryan Cherwinski, Denali; [Samuel Liebl](#)
- 3:00 PM**      **Session Adjourns for Coffee Break**
- Alternate**      **Biosolids Land Application Efficiencies Through Automation**  
Nayeli Basulto, Lystek International Inc.; [James Dunbar](#)

## **Session 18: Understanding Digester Rheology and Implications for Mixing and Operations**

**Thursday, June 20**

**1:30 PM - 3:00 PM**

**Speakers:** Rashi Gupta, Carollo; Matthew Higgins, Bucknell University; Mohammad Shallouf, Anaergia; Hao Pham, Ovivo; Erik Larson, Vaughan; Ed Wicklein Carollo

Anaerobic digestion has become a common process in municipal and industrial wastewater treatment due to the production of high-value products (e.g., biogas) and increased volatile solids reduction which reduces landfilling costs. While anaerobic digestion has been applied for decades, digester stability is often a function of a variety of physical, chemical, and biological parameters. Recently, the importance of digester rheology and mixing have gained focus due to the complexity of the non-Newtonian behavior of digester substrates and difficulty in providing uniform mixing. During this session, presenters will discuss how digester rheology changes with substrates and age and its impact on mixing; the latest developments in modeling digester mixing; and discuss commercial options for more uniform mixing.

A full agenda for this session is coming soon!

**Session 19: Carbonization**

**Thursday, June 20**

**1:30 PM - 3:00 PM**

- 1:30 PM      Pyrolysis Gas Thermal Oxidation: PFAS and Emissions Control**  
Alexandre Miot, Silicon Valley Clean Water; John Ross, Brown and Caldwell;  
John Norton, Great Lakes Water Authority; Matt Magruder, Milwaukee  
Metropolitan Sewerage District; Lloyd Winchell; Katherine Bell, Brown and  
Caldwell
- 2:00 PM      The State of Full-Scale Implementation - Biosolids Pyrolysis and  
Gasification**  
John Ross, DJ Wacker, Brown and Caldwell
- 2:30 PM      Intensification of Pyrolysis by Autothermal Operation**  
Robert Brown, Iowa State University; Philip Pedros, Mott MacDonald; Tannon  
Daugaard, Iowa State University; Adam Hendricks, Philadelphia Water  
Department
- 3:00 PM      Session Adjourns for Coffee Break**

## **Session 20: Nutrient Management Innovations**

**Thursday, June 20**

**3:45 PM - 4:45 PM**

- 3:45 PM**      **Phosphorus Sequestration and Recovery with Calcium: Validating Chemical Equilibrium and Process Models with Case Studies**  
Sara Arabi, Stantec; Cole Sigmon, Christopher Marks, City of Boulder; Art Umble, Shelley Trujillo, Stantec Inc.; John Gage, City of Longmont; Roberto Luna, Thomas Worley-Morse, Metro Wastewater Reclamation District
- 4:15 PM**      **WRF 5108 Acid+: A Novel Treatment Process Configuration for Simultaneous Process Intensification and Struvite Management**  
Ahmed Abouhend; Christopher Muller, Brown and Caldwell; Chul Park; Dante Fiorino, Brown and Caldwell; Ashwin Dhanasekar, The Water Research Foundation; Natalia Perez, NYCDEP; Krishnamurthy Ramalingam, The City College of New York; Tyler Schweinfurth, City of Columbus
- 4:45 PM**      **Session Adjourns**
- Alternate**      **A laboratory-scale evaluation of the factors controlling pathogen and indicator organism inactivation under ambient conditions**  
John Harron, Michigan Technological University; Jennifer Becker, Michigan Technological University; Eric Seagren, Michigan Technological University

**Session 21: Environmental Justice**  
**Thursday, June 20**  
**3:45 PM - 4:45 PM**

More information about this session is coming soon!



**Session 22: Anaerobic Digestion**

**Thursday, June 20**

**3:45 PM - 4:45 PM**

**3:45 PM**      **Investigating the differences of process performance and digestate physical properties between TPAD and conventional mesophilic digestion**  
Matthew Higgins, Labella Associates DPC; [Emma Guertin](#)

**4:15 PM**      **Achieving Class A Biosolids with Staged Thermophilic Anaerobic Digestion**  
Jessica Johnson, Metropolitan Sewer District of Greater Cincinnati; [David Parry](#);  
Marialena Hatzigeorgiou

**4:45 PM**      **Session Adjourns**

**Session 23: Dryers: The New, the Old, and the Safe**  
**Thursday, June 20**  
**3:45 PM - 4:45 PM**

**3:45 PM**      **Biosolids Thermal Dryer Safety Fact Sheet - The Fundamentals for Managing Risks of Fires and Explosions**  
Webster Hoener; Jody Barksdale, Carollo Engineers

**4:15 PM**      **Live to Dry Another Day: Low Energy Residuals Drying**  
Paul Knowles

**4:45 PM**      **Session Adjourns**

**Alternate**      **New Fluidized Bed Incinerators at the Highland Creek Treatment Plant: Replacing Old Technology with State of the Art**  
Peter Burrowes; Vanessa Carew, Jacobs; Rob Deobald, City of Toronto; Heather Partridge, City of Toronto

**Session 24: Program Drivers: Economics, Regulatory, and Market Considerations**  
**Friday, June 21**  
**8:30 AM - 11:15 AM**

- 8:30 AM**      **The Role of State Regulations on Biosolids Beneficial Use and Disposal Trends**  
Nickolas Hines
- 9:00 AM**      **Biosolids Management and Cryptic Currencies — Net Zero, Emerging Contaminants, and New Biosolids Markets**  
Ruth Roxburgh, Jacobs; Roya Pishgar; Baha Hasasneh, Yangyang Feng, Jacobs; Steven Dimock, EPCOR; David Curran, Jacobs; Saif Molla, EPCOR Water Services
- 9:30 AM**      **Biosolids Solutions Tailored to Fit Small Facilities**  
Micah Blate; Julianne Amenta
- 10:00 AM**      **Networking and Coffee Break**
- 10:15 AM**      **Unfreeze & Change: Nationwide Cost Survey Triggered by PFAS Provides Insights on Biosolids Best Management Practices for Clean Water Agencies**  
Henry Croll, Pooja Sinha, Joan Oppenheimer, Nicole Stephens, Stantec; Emily Rempel, NACWA; Donald Ryan; Art Umble, Stantec; Joseph Jacangelo
- 10:45 AM**      **The Results of Replacing a Class A Biosolids Stabilization Technology to Gain Capacity and Save Money**  
Gina MacPhee, Adam Parmenter, HDR
- 11:15 AM**      **Conference Adjourns**
- Alternate**      **PFAS and Trace Contaminants Challenges to Beneficial Use of Biosolids and Compost**  
James Slaughter

**Session 25: Energy Management: From Production to Safety**  
**Friday, June 21**  
**8:30 AM - 11:15 AM**

- 8:30 AM**      **A Comprehensive Case Study on Municipality Biogas Utilization: from Production Projection to Technology Selection**  
Yuan Fang, Drury Whitlock, Stantec; Chris Wilson
- 9:00 AM**      **Energy Management at WRRFs - Is Hydrogen a Viable Alternative?**  
Tracy Hodel, City of St. Cloud; Dale Gabel, Samuel Reifsnnyder, Carollo Engineers; Brendan Wolohan
- 9:30 AM**      **From Sour to Sweet: Treating Biogas with High H<sub>2</sub>S Concentrations**  
Bryan Lisk, Hazen and Sawyer; Adam Behr; Karloren Guzman, City of Tampa
- 10:00 AM**      **Networking and Coffee Break**
- 10:15 AM**      **Digesters & Biogas - Safety From Hard Lessons-Learned**  
Yasmine Boudhaouia; Matthew Williams, Thermal Process Systems; Keith Albretsen
- 10:45 AM**      **Full-scale demonstration of micro-aeration for hydrogen sulfide control at the Chambers Creek Regional Wastewater Treatment Plant**  
Peter Zemke, Christopher Muller, Karina Woodland, Embrey Bronstad, Brown and Caldwell; Karla Guevarra; Renisha Karki, Lutgarde Raskin, University of Michigan; Vicky Hollingsworth, Brown and Caldwell; George Nakhla; Katherine Bell, Brown and Caldwell; Amanda Summers, Pierce County Public Works and Utilities
- 11:15 AM**      **Conference Adjourns**

## **Session 26: Troubleshooting & Optimization**

**Friday, June 21**

**8:30 AM - 11:15 AM**

- 8:30 AM**      **Understanding the Stability and Capacity of Full-scale Anaerobic Digesters Using a Bench-scale Test**  
Peter Schauer, Ornella Sosa-Hernandez, Clean Water Services
- 9:00 AM**      **A Beautiful Biosolids Product in the Making: Dewatering Optimization and Aerobic Curing of Thermally Hydrolyzed Solids at HRSD's Atlantic Treatment Plant**  
Dana Gonzalez, Jeffrey Nicholson, Christopher Wilson, Charles Bott, HRSD
- 9:30 AM**      **Deployment of a Struvite-Control Optimization System at a Large Wastewater Treatment Plant**  
Chris Hill, Richard Waterous, Jenny Hansen, Kemira Water Solutions Inc.; Leo Pou, Carollo Engineers; Ricardo Colon, Kemira Water Solutions Inc.
- 10:00 AM**      **Networking and Coffee Break**
- 10:15 AM**      **Acute Digester Heating Issue Uncovers Chronic Plant Ailment**  
John Maley
- 10:45 AM**      **Reheating of Dried Biosolids: Causes and Mitigation Options for Drying Facilities**  
Sean Murnan, Synagro
- 11:15 AM**      **Conference Adjourns**
- Alternate**      **Troubleshooting VSR: A Multi—Approach Strategy Towards Significant Operational Savings**  
Giovanna Portioli; Steven Lockler, McDowell Creek Wastewater Treatment Plant; Maggie Macomber, Charlotte Water; Darrell Dewitt; Muriel Steele
- Alternate**      **Using the Capillary Suction Time Test as a Tool to Support Operation of the Dewatering Process**  
Mike Gates, Clean Water Services; Chris Maher; Phoebe Wu, Clean Water Services

## **Session 27: Case Studies & Lessons Learned**

**Friday, June 21**

**8:30 AM - 11:15 AM**

- 8:30 AM**      **Biosolids Master Planning in Tulsa, Oklahoma to Develop a Sustainable Biosolids Management Program**  
Todd Williams; Adrian Romero, Thomas Tom Johnson, Lars Ostervold, Jacobs; Matt Vaughan, City of Tulsa
- 9:00 AM**      **Developing a Regional Biosolids Master Plan for the North Shore Water Reclamation District**  
Persephone Ma; Joe Marino, Brown and Caldwell; Steve Waters, North Shore Water Reclamation District; Natalie Sierra, Brown and Caldwell; Travis Vodnik, Emily Prentice, North Shore Water Reclamation District
- 9:30 AM**      **Commissioning of a Modern Centrifuge Solids Dewatering System**  
Mike Gates, Clean Water Services; Chris Maher
- 10:00 AM**      **Networking and Coffee Break**
- 10:15 AM**      **Biosolids Pyrolysis and Gasification — Lessons Learned from Early Adopters**  
Jay Surti, Charles Winslow, GHD
- 10:45 AM**      **The Road to Resource Recovery: Equipment Procurement, Natural Gas Utility Negotiations, D3 RINs, and IRA Credits for an Enhanced Energy Recovery Project**  
Eric Auerbach; Jess Rosentel, Capital Region Water; Nick Taylor, Shayla Allen, Arcadis
- 11:15 AM**      **Conference Adjourns**
- Alternate**      **Preparing for the Future: WAS Only Indirect Thermal Drying at Manchester Creek WWTP**  
C Bullard, Ruth Borgmann, Jacqueline Yeh, Hazen and Sawyer; Meredith Bridwell; Anthony Young, Hazen and Sawyer