

Presenter: Patrick Dube

Company: Water Environment Federation

Presentation Title:

Session Description: Biosolids have long played a critical part of resource recovery at water resource recovery facilities around the country. Through land application, incineration or bagged fertilizer products, biosolids represent enormous potential value to utilities. The Water Environment Federation has long been a proponent of biosolids and continues to work to broaden the impact of their use, protect public health and promote technology research and adoption. This presentation will address the present and future of biosolids and the role WEF and industry professionals can play moving forward as we continue to utilize this renewable resource.

Biography: Patrick Dube is the Biosolids Program Manager in the Water, Science and Engineering Center at the Water Environment Federation.

Presenter: Daniel Miller

Company: Jones and Henry Engineers

Presentation Title: *Hey, small plants need dewatering too !*

Session Description: Managing biosolids in Small Communities

Presenter: Matthew Smith

Company: Strand Associates, Inc.

Co-Presenter: David Jenkins

Presentation Title: *Hamilton, Ohio - WWTP Biosolids and Energy Master Planning*

Session Description:

This presentation will discuss biosolids and energy use master planning efforts within the City of Hamilton, Ohio. The City's wastewater treatment plant serves approximately 63,000 residents within the City and surrounding areas in Butler County Ohio. The City currently disposes of undigested, dewatered biosolids via landfill or land application of lime stabilized biosolids. The biosolids master plan evaluated various anaerobic digestion and lime stabilization alternatives, considering both Class B land application and the generation of exceptional quality biosolids. The plan evaluated the potential of receiving, digesting and disposing of biosolids from surrounding communities and taking

in high strength waste from industries in the area in addition to handling biosolids from the City itself. Production and reuse of biogas through co-generation or the production of pipeline quality gas was evaluated for the anaerobic digestion scenarios. The presentation will summarize the evaluation with specific emphasis on the present worth costs associated with lime stabilization, anaerobic digestion, processing biosolids and high strength waste from remote facilities and biogas reuse alternatives.

Presenter: John Clark

Company: City of Fort Wayne

Presentation Title: *Troubleshooting Cogen*

Session Description:

The City of Fort Wayne's Waste Water Treatment plants generates 800 kW of power every day for its operations. This is about 30% of the power needed to run the plant on an average flow day.

The benefits we have seen is a \$360,000 per year drop in our electric bill, Lowered actual air emissions from the plant burning methane through our Generators for power rather than wasting it through our torch. We have discovered the potential of a new revenue stream bringing in High Strength Waste from other sources than the FOG and sewer systems we are used to.

We found we were not prepared for the interest this process would raise from local food processors and manufacturing complexes as a new avenue to dispose of wastes. We were not prepared to determine compatibility of material, Gas generation potential, logistics of hauling material, and setting contracts we could really live with. Design of our complex has led to O&M issues that as we grow will have to be modified, eliminated, or absorb due to being too costly to eliminate.

Challenges that have been arising in the last 2 years are life of H₂SO₄ media, Gas handling equipment O&M costs and durability. Generator overall maintenance costs, eating away at the savings we are seeing from the power generation.

We are still not fully prepared for the difference in material coming to the site and spiking our digesters. We do not have the handling systems in place to mix a stable recipe to feed at a stable rate to the digesters. One of the major challenges is not having solid control on gas production so at sometimes we barely produce enough gas to keep the Genset's on line and the next day we are running the Genset's and boilers at max on Methane and burning the torch.

If your utility is looking at entering into this process and utilizing your digesters to process methane and co-gen. Visit a lot of sites that are doing it. Set the generator people down and have serious discussion on true O&M costs of running something 24/7/365.

Presenter: Aaron Harter

Company: Synagro

Presentation Title: *Biosolids in Agriculture*

Session Description:

This session will give a comprehensive look at how biosolids impact agriculture. Many aspects of product marketing and evaluation will be discussed such as: farmer/public perception, marketing, and financial worth.

Presenter: Dave Rutowski

Company: HACH

Presentation Title: *Evaluation of high precision in-situ analysis against benchtop lab analyzers for process insight*

Session Description:

Lab analysis of composite samples has traditionally been the basis of plant operation and daily adjustments. By using in-situ analyzers that can very precisely correlate to real-time process conditions actual process conditions can be seen vs average. This has significant benefits for energy optimization, nutrient removal, and permit compliance. By running test trails of in-situ analyzers against grab samples analyzed on the benchtop the precision of the analyzers showed remarkable correlation. More importantly, seeing the real-time data from 48 to 420 daily data points revealed changes in process that were washed out in traditional composite sampling.

Presenter: Brenda Stephanoff

Company: IDEM

Presentation Title: *Land Application Program/Rules*

Session Description:

Give an update of where IDEM is with potential rule revisions. Get back to basics on land application rules - specifically discussing biosolids quality, sampling timing/frequency, pathogen reduction, vector attraction reduction. Talk about the other programs 327 IAC 6.1 covers such as land application of pollutant-bearing water (wastewater) and the agricultural lime notification program.

Presenter: James Goldhardt

Company: Ovivio

Presentation Title: *THP Applied to small to Medium sized WWTP-A modular approach with a Simple to Operate Concept.*

Session Description:

While many wastewater treatment facilities have to deal with the needs to produce a dischargeable wastewater, they continuously have to deal with the solids that these facilities produce. The introduction of thermal hydrolysis as a means to reduce the amount of solids to dispose of with an additional potential to produce energy has made this technology attractive. However, these solutions are more designed for large scale operations, leaving smaller facilities with the same issues. A thermal hydrolysis process has been developed for these smaller to mid-sized facilities. Using a technology that is well known to wastewater operators and having been designed with the operator in mind, this technology, using an array of heat exchangers can produce the same results that the more talked about technologies can. The system is modular based around a series of containers matched together based on flow that is simple to install and simple to operate. The challenges of such a system are the perception of heat exchangers. The challenges of heat exchangers was examined, reviewed and addressed with a system for cleaning the heat exchangers automatically. The clean cycle selected is robust and effective. A case study will be presented that shows the results of this technology over a five year period. The data will show how this technology reduces the sludge for disposal and also how costs can be reduced on the dewatering side by reducing polymer consumption.

Presenter: John Rigdon

Company: Elements Material

Presentation Title: *An in-depth look at on-line monitoring to make analytical measurements*

Session Description:

An in-depth look at on-line monitoring to make analytical measurements

As technology is used more and more in traditional wastewater treatment, it is probably a good idea to take a look at common technologies, how they differ from traditional measurements and some good practices to make the data reliable and useful...

Presenter: Mark Stanifer

Company: IDEM

Co-Presenter: Rene Repar

Presentation Title: *Reporting to IDEM: How to Make Everyone Happy*

Session Description:

The session will provide expectations for where and how to submit the various reports required by NPDES and IWP permits, along with a discussion of the recent revisions made to the IDEM Excel MRO and MMR forms and an update on Wastewater Certification Issues.

Presenter: James Musser

Company: Town of Neburgh

Presentation Title: *What the MDL!!!*

Session Description:

While conducting an MDL study, have ever stopped and asked yourself, "what the MDL?" If so, this presentation is for you. The presentation, "What the MDL" will be a comprehensive 25-minute discussion of the technical aspects of performing the most recent MDL study update as described in 40 CFR; Part 136; Appendix B, Rev 2. First, we will dive into a brief review of the MDL requirements as it may pertain to an NPDES permit requirement. Then we will take a look at how one might perform an MDL on various analyses (e.g., Total Suspended Solids, Ammonia (as N), Total Phosphorus, and Metals). Next, we will look at ongoing data collection and the annual verification process. Finally, we will review the validation process and the use of the MDL.

Presenter: Kim Rohr

Company: IDEM

Co-Presenter: Bridget Murphy

Presentation Title: *IDEM News and Updates*

Session Description:

The presentation is a hodge podge of things we think people need to know or that we get quite a bit of questions about. It includes: cyber-security, SSS inspections, common inspection issues, proper reporting, certified operator rule, and who to contact.

Presenter: Michael Borchers

Company: Arcadis

Presentation Title: *How Good are You? Improving the Effective Management of Your Wastewater System*

Session Description:

The focus of this session will be on understanding and leveraging cost information to improve the efficient management of wastewater systems. Wastewater systems have a variety of cost drivers that require labor, electricity, chemicals, and other materials and supplies to ensure proper operation. We will focus on how managers can use available information to derive a profile of wastewater system functional costs and significant operational risks. They can then focus on tailoring the processes around these areas to reduce cost, reduce risk, and improve overall efficiency.

Presenter: Austin Collins

Company: Hach

Presentation Title: *Single Green Test Method for the Determination of Total Nitrogen in Water*

Session Description:

The United States Environmental Protection Agency (EPA) does not regulate the discharge of total nitrogen (TN) as a single analyte and as a result, there are no EPA approved methods for TN. The lack of an EPA approved TN method creates confusion for wastewater discharge utilities and places a resource burden on their laboratories that are required to report TN to their State Regulator.

Total nitrogen is defined as the quantitative sum of total Kjeldahl nitrogen (TKN) and nitrite/nitrate (NO₂ + NO₃), where TKN is the sum of organic nitrogen, free ammonia, and ammonium ions.

$$[\text{TN}] = [\text{TKN}] + [\text{NO}_3] + [\text{NO}_2]$$

$$[\text{TKN}] = [(\text{NH}_3 + \text{NH}_4^+)] + [\text{Nitrogenorg}]$$

Utilities reporting TN have typically had to perform a minimum of two test procedures (TKN and total nitrate) using hazardous chemistries that may contain mercury and cadmium.

In 2010, Hach developed a green single test procedure for the determination of TN (TNTplus 826/827/Hach Method 10208) which was subsequently incorporated in to the Hach simplified Total Kjeldahl Nitrogen Method (TNTplus 880/Hach Method 10242) that EPA approved for regulatory compliance reporting in 2017. Because of this EPA approval action, States using their primacy authority have begun to approve Hach Method 10208 for TN compliance reporting.

This presentation will review the analytical steps of the Hach TN Method and provide the validation results that were used in obtaining EPA approval of the Hach TKN Method.

Biography: Austin Collins is a member of the water and waste water team with Hach. He has been with Hach since 2014 and manages the Indiana territory. He is a 2006 graduate of Purdue University West Lafayette, IN. He is a member of the Alliance of Indiana Rural Water, Indiana Rural Water Association, IWEA and their respective operator's associations, and the Indiana Industrial Operators Association.

Presenter: Tina Wolff

Company: Kokosing Industrial

Co-Presenter: Kirby Dipert

Presentation Title: *Mining Cash from your Capital Projects*

Session Description:

This session will introduce efficiency incentive programs offered by electric utilities for reductions in gas and electric usage through equipment and process modifications. Lockheed Martin Energy, who administers NIPSCO's incentive program, will provide an introduction to how the program works for prescriptive and custom improvements. Kokosing Industrial will present a case-study for Syracuse, Indiana where the energy efficiency rebates amounted to 22% of the capital construction cost. Together, they will provide ideas on where cash may be waiting to be mined by water and wastewater utilities.

Presenter: Yong Kim

Company: UGSI Solutions, Inc.

Presentation Title: *Optimizing Polymer Efficiency for Better Sludge Treatment - Two Case Studies*

Session Description:

According to the recent survey, over 30% of biosolids management cost is being spent for polymer. A well-designed polymer system is the key for achieving superior performance in thickening and dewatering processes. There are several factors that affect the quality of polymer solution including handling and storage, quality of dilution water, mixing strategy, and appropriate aging. This paper illustrates how to optimize polymer activation/mixing with various experimental data and case studies at water and wastewater treatment plants.

Dilution Water Quality - Use of Reclaimed Water

Hardness which represents a major portion of the ionic strength of dilution water plays an important role in polymer activation. If hardness exceeds certain level (400 mg/L), it is strongly recommended to add softening device to minimize the negative effect of hardness. With the increasing trend of utilizing reclaimed water for polymer mixing at WWTPs, it is crucial to understand the effect of residual chlorine on the quality of polymer solution. As a general guideline, chlorine level in reclaimed water is to be less than 3 mg/L to avoid damaging polymer molecules. Use of reclaimed water also presents other concerns such as suspended solids, turbidity, and many dissolved ions that may seriously degrade the quality of polymer solution.

Emulsion Polymer Systems

The concept of two-stage mixing is well established in polymer activation: very high-energy mixing during the initial wetting stage to prevent fisheye formation, then low-energy mixing to prevent damaging polymer molecules. Sufficient residence time of low-energy mixing stage was found to make a significant improvement of polymer solution efficiency. Since emulsion polymer consists of polymer gels and hydrocarbon oil, it is also important to maintain certain concentration in the mix chamber to maximize the role of inverting or breaker surfactant to optimize emulsion polymer activation (ANSI/AWWA Standard for Polyacrylamide B453-06). Two-step dilution is proposed to achieve the goal - higher concentration over 1% during the primary mixing followed by secondary dilution to meet the feed concentration.

Benefit of two-stage mixing and sufficient residence time is clearly illustrated with supporting data from laboratory and a several month-long trial at Neshaminy Water Treatment Plant near Philadelphia. The plant operates at the capacity of 15 MGD to serve about 40,000 population. Two different mixing chambers were evaluated side-by-side in dewatering alum-carbon sludge with two belt filter presses running simultaneously. It was striking to observe that an upgraded mixing chamber performed 35% better than the other, while yielded to 4% drier cake (Fig. 1).

Dry Polymer Systems

Non-uniform mixing energy distribution in a dry polymer mixing tank is detrimental to polymer solution because a considerable amount of polymer chains are broken by high mixing energy in impeller region. It is known that mixing intensity distribution is closely related to the ratio of impeller to tank diameter: a larger and longer impeller generates more uniform mixing intensity within the mix tank, which is ideal

for polymer mixing. Dry polymer system developed based on this principle was installed at the Fairfield-Suisun Sewer District in northern California. The plant’s original dry polymer system produced inconsistent quality of polymer solution with extensive aging time and consumed more polymers than required. The parameters monitored include the percent solids in incoming sludge and outgoing cake, sludge flow rate, polymer dosage, and polymer solution concentration. After one year operation of upgraded dry polymer system, the plant realized about 40% less polymer dosage for dewatering by screw press and 18% increase in sludge throughput (Fig. 2).

Aging – To Be Re-Evaluated

Dry polymer solution is known to be aged for hours after mixing is completed in batch tanks. It is supposed to help for long-chain polymer molecules to achieve extended structure to become more effective in solid-liquid separation. However, it was observed that the aging time can be significantly reduced or even eliminated by applying very-high energy mixing up to G-value of 15,000 sec⁻¹ during the initial wetting stage. It can improve process design by cutting down the batching cycle of dry polymer mixing by a couple of hours. When reclaimed water is used for dry polymer mixing, aging must be carefully re-evaluated because of many unfavorable ingredients included. Chlorine level, suspended particles, turbidity, and dissolved ions are all reacting with polymer molecules in solution and resulting in degraded polymer solution during aging.

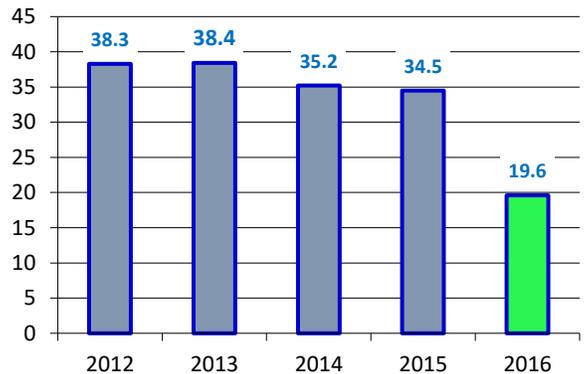
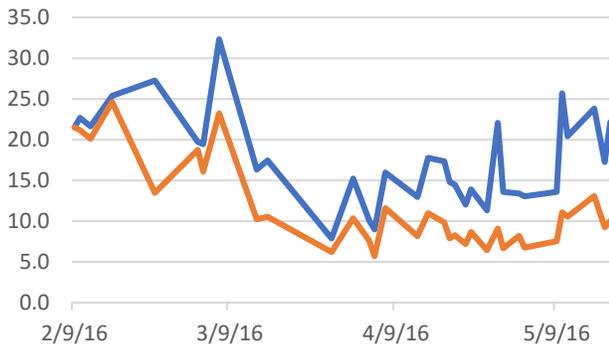


Fig 1. Polymer usage (lb/DT) at Neshaminy WTP

Presenter: Dave Baran

Company: quasar energy group

Co-Presenter: Mike Maringer

Presentation Title: *Feedstock Profiles for D3 and D5 RIN Generation*

Session Description:

In a co-digestion system, multiple types of feedstocks are processed concurrently to improve the overall health of the anaerobic digester and produce biogas. These feedstocks can include manure, wastewater sludge, food waste, fats oils and grease (FOG) and/or other wastes. The biogas created through anaerobic digestion can be generated into renewable fuel. When registered with the EPA's Renewable Fuels Standard, biofuel producers can earn environmental credits in the form of Renewable Identification Numbers (RINs) which are tied to each gallon of biofuel. D3 and D5 RINs are produced through anaerobic digestion.

This presentation will discuss the difference between D3 and D5 RINs, what feedstocks are involved to make each type of RIN, and the testing involved to determine the gas content and classification of RIN. It will define their current value in the marketplace and the end use options of the fuel. Also discussed will be how both D3 and D5 RINs can be generated from the same project through physical separation and gas monitoring of the feedstocks and several regulatory efforts lobbied by industry associates to attempt to make this process easier. The presentation will discuss how a municipality can become registered with the RFS, explore case studies and talk about the marketplace for selling RNG.

Biography: Dave Baran joined quasar in 2014 and has played an active role in developing numerous facilities in new geographies. He is a core member of quasar's project development team and directs business development, due diligence on new ventures and preconstruction project management. Baran comes from a background in management consulting where he conducted projects and advised clients in renewable energy, environmental services and industrial manufacturing. He also has international experience, having worked in Nairobi, Kenya with a sanitation, composting and waste to energy social enterprise. Baran holds a Bachelor of Science from Georgetown University and attended the Universidad de Buenos Aires in Argentina.

Presenter: Becky Ruark

Company: IDEM

Presentation Title: *Using Lab Analysis to Support Plant Operations*

Session Description:

Data might be considered a necessary evil in the pursuit of permit compliance. However, lab data can be very beneficial to operations as it pertains to process control. It might be surprising to know that lab staff can see process changes as soon or even before operations staff does. This brief technical talk will discuss measures that can be taken to insure that the data that is obtained daily, weekly and monthly is used in a manner that most benefits operations and lab staff.

- How to use 30 minute settling, MLSS and RAS data
- DO measurements in aeration tanks and process control
- Chlorine data, making process changes, and definition of daily max
- What do changes in ammonia removal indicate about biological activity
- What pH values should be a red flag to a lab tech
- How to handle automated pH readings
- Phosphorus data and chemical feed
- Effluent DO readings and seasonal variability
- Seeding CBOD samples during disinfection season
- Setting up dilutions for E. coli analysis when needed
- Using sufficient volume of sample for TSS analysis

Presenter: Teddy Deahl

Company: Bowen Engineering

Co-Presenter: Katie Jackson, Wessler Engineering

Presentation Title: *Centrifuge Discssion*

Session Description: We plan to walk through the design and construction phase of the recent Lebanon Utilities WWTP sludge handling project. We will discuss the parameters that led to the selected sludge drying process, the conveyance system and the size/type of the haul off area. We will discuss the pros and cons during the construction phase then finish up with results and lessons learned. The system will have been in operation for almost a year by March 20th so we should have a good data to compare to our initial assumptions.

Biography: Teddy Deahl, Energy Engineer for Performance Contracting, Bowen Engineering. Teddy has been implementing Indiana water/wastewater Guaranteed Savings Contracts with Bowen Engineering for over five years. He has been fortunate to

be involved with over 40+ Guaranteed Savings Contracts with Bowen and really enjoys the energy efficiency side of the water and wastewater projects. Teddy is currently the Treasurer for IWEA and involved in the Collections and Public Outreach Committees. In his free time, he enjoys skiing on the white river preferably not after a rain event.

Co-Presenter Bio: Katie Jackson, Project Engineer, Wessler Engineering. Katie has been working in the wastewater department at Wessler Engineering for three years. The Lebanon Utilities WWTP Sludge Handling Project was Katie's first GSC project and she enjoyed the process of designing and constructing along-side Bowen Engineering. Katie is currently a member of the Operations and Management committee within IWEA. In her free time, she enjoys eating and new restaurants and hiking with her dogs.

Presenter: Nora Manor

Company: Anderson Water Pollution Control Utility

Presentation Title: *Oh No, We have to do a TRE. Now What?*

Session Description:

Certain Municipal NPDES permits require a POTW to perform WHOLE EFFLUENT TOXICITY TESTS. This outsourced test involves collecting samples for 7 days to analyze whether aquatic organisms are healthy and happy in the effluent using certain specific aquatic organisms, such as, Cladoceran (*Ceriodaphnia dubia*) and Fathead Minnow (*Pimephales promelas*). In the event that samples show a "demonstration of toxicity," sampling and testing must be repeated within 2 weeks. If the same or similar "demonstration of toxicity" occurs, the facility must conduct a TRE or Toxicity Reduction Evaluation.

This discussion details steps the City of Anderson WPCU took to formulate and carry out a TRE. Don't be afraid, you too can formulate and carry out a TRE. It sounds daunting but the resources are available to do what is needed. Sampling, testing and reporting are things that we, as operators, do all of the time. Remember you are the expert at your own facility.

BIOGRAPHY: Mrs. Manor has been the Superintendent of the Anderson Water Pollution Control Utility for over 13 years. She studied Biology and Chemistry and holds degrees from Ball State University. She has supervised and directed multiple collection system and treatment plant projects. Nara has received awards from the IWEA, WEF and the IIOA and holds a Class IV and Class D certification from IDEM. In addition she has a German Shepherd Dog that is almost as big as she is named Cassiopeia or Cassie for short who likes to drag her around the yard.
