SUMMER
2018

The Official Publication of the Water Environment Association of Utah

DIGESTED news

Celebrating 50 Years of Clean Water

Resources abound FOR UNDERSTANDING INTELLIGENT WATER SYSTEMS

Snyderville Basin Water Reclamation District
2800 Homestead Road
Park City, Utah 84098
Address service requested

INSIDE:

Tensar

Are You Stuck In The Mud?

Harley Davidson DCP Case Study

The Challenge:

This site had an underground detention system designed under a proposed new parking lot. The grade at which the parking lot needed to be at required minimum excavation to construct the detention system and parking lot at the estimated budget of construction. **The soil on site was much softer than anticipated and required over-excavation with a change order in the tune of $50,000.**

The Solution:

Tensar & Mountainland Supply came on-site at the contractors request, performed DCP (Dynamic Cone Penetrometer) tests, and calculated how soft the soil was. Based on the soil information a design was calculated and a Triax Geogrid was used that only required 6" of Aggregate to build the platform for the detention system to be placed on site at the original designed elevation. **Not only did the Geogrid save over-excavation and import costs, it also saved several days in man hours and equipment costs.**

Call Your Mountainland Sales Representative for a FREE Site Evaluation and Solution!

MOUNTAINLAND
SUPPLY COMPANY

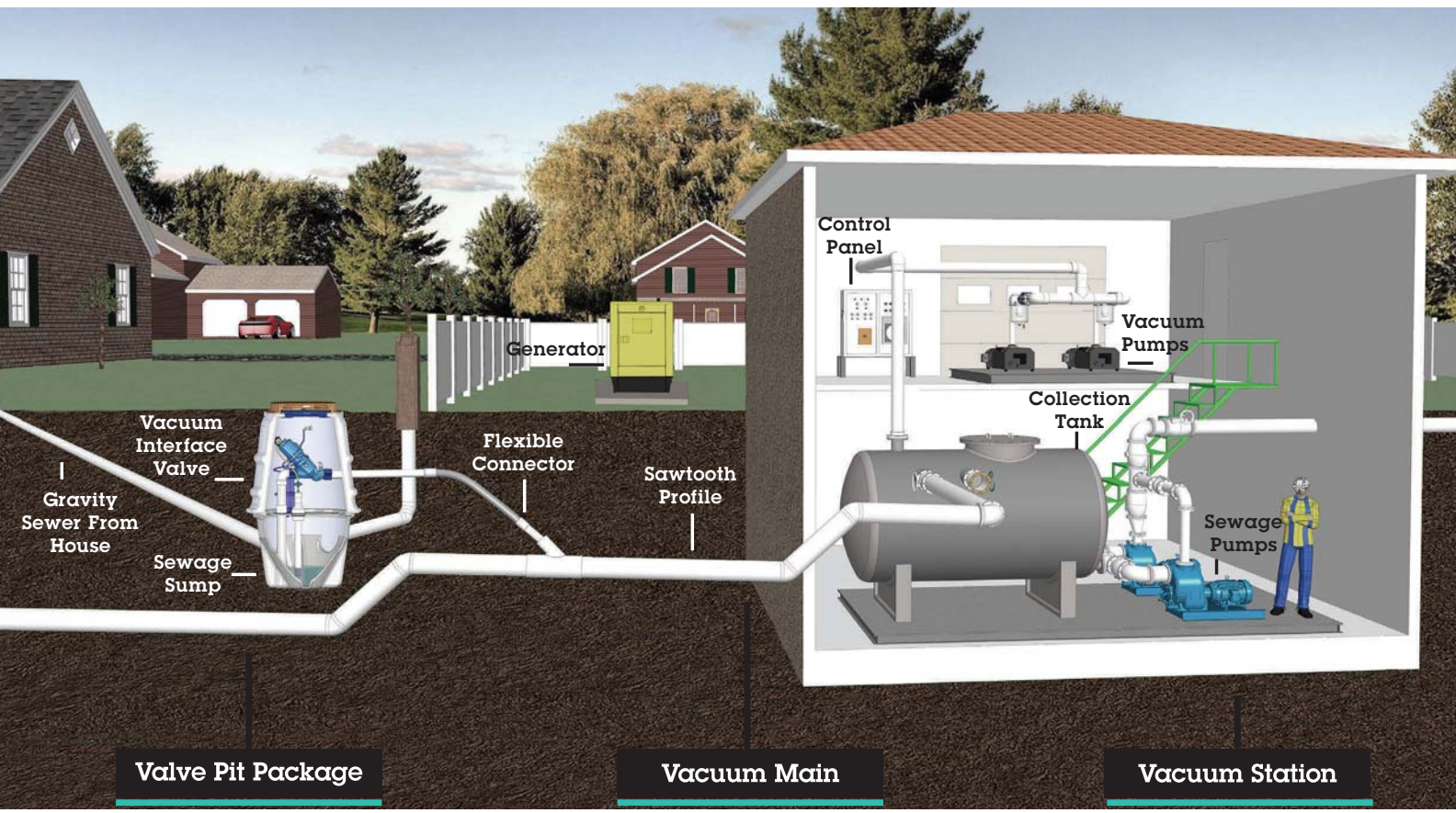
mountainlandsupply.com | (800) 666-5434

Airvac

Sewer Solution for Septic Replacement

Airvac Vacuum Sewer Systems are clean, efficient, easy to maintain, easy to install and typically less expensive than other collection systems. It is a proven technology with a long history of success and reliability.

- Minimal surface disruption
- Eliminate multiple lift stations
- Environmentally sound
- No power required at the valve
- Ease of field changes
- No operator exposure to raw sewage
- Shallow burial depth
- Smaller pipes
- No infiltration, inflow or exfiltration
- Low O&M



Contact us for a free system layout and cost estimate.

Aqseptence Group, Inc.
Vacuum Technology Systems

www.aqseptence.com

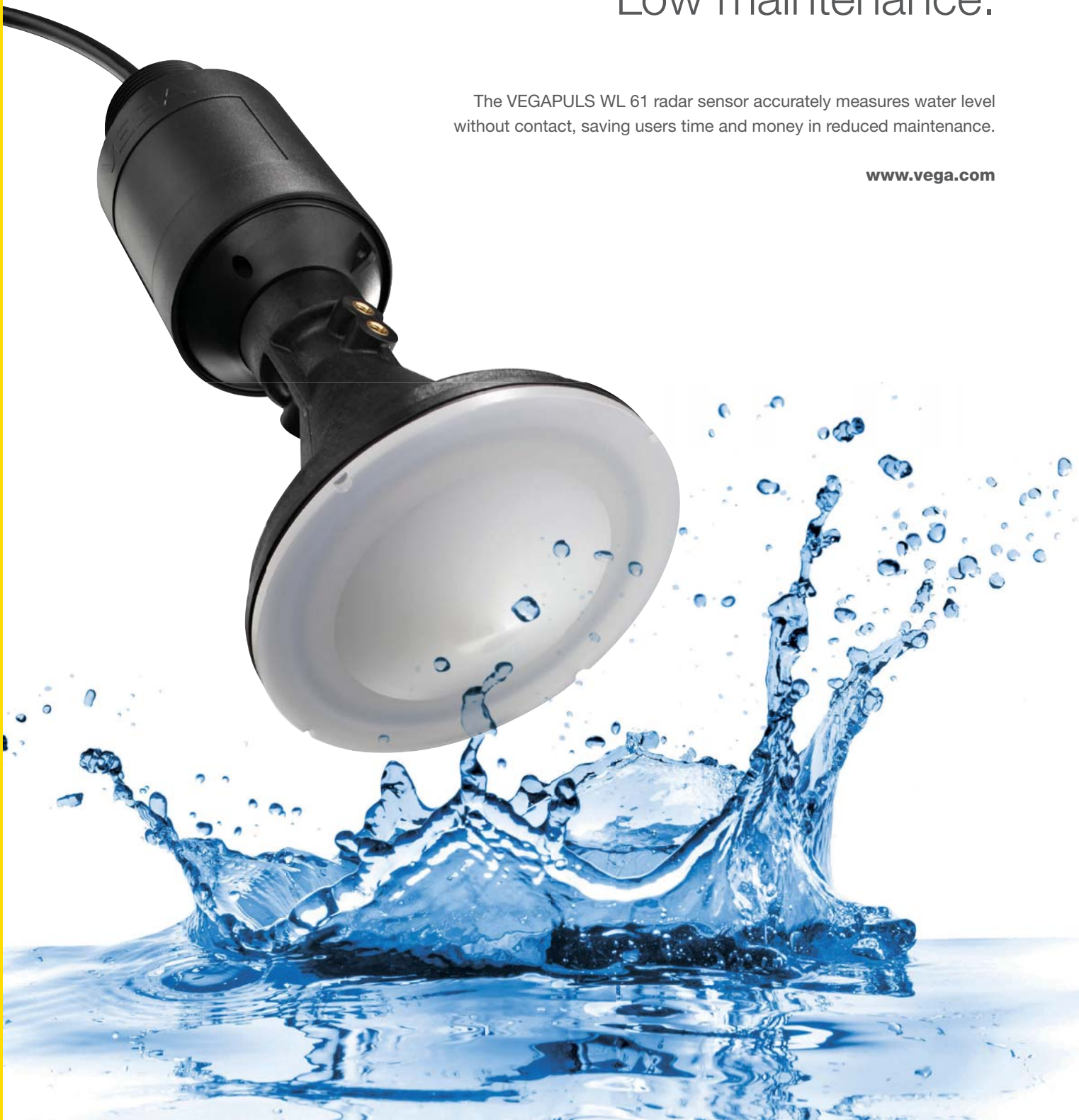
Rochester, IN -Headquarters
Tampa, FL -Sales Office
Phone +1 574 223 3980
info.airvac@aqseptence.com

Looking Forward VEGA

High functionality.
Low maintenance.

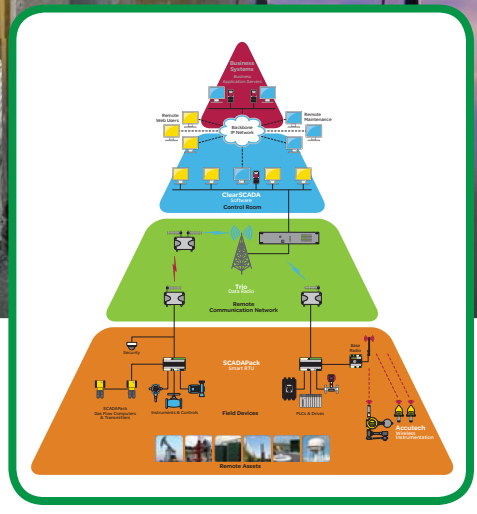
The VEGAPULS WL 61 radar sensor accurately measures water level without contact, saving users time and money in reduced maintenance.

www.vega.com



Need help in transforming remote asset data into valuable business insight?

Let's talk!



Make the most of your remote assets with complete end-to-end solutions for monitoring and controlling field operations across a widely dispersed infrastructure

Controlling cost of ownership

The installation, operation and maintenance of remote site SCADA operations is often the most significant overall long term expense factor. With scalability,flexibility and ease-of-use in mind, Schneider Electric's Telemetry and Remote SCADA Solutions are tailored to help lower this total cost of ownership.

Secure and Reliable SCADA

Safety and availability are must-have characteristics of critical infrastructure. This especially holds true when considering security for SCADA systems that monitor and control remote operations across a wide array of communications technologies. At Schneider Electric, our Telemetry and Remote SCADA Solutions incorporate solid security at all levels, from the field to the enterprise.

Minimizing risk by improving safety and regulatory compliance

Many industries are challenged with increasing requirements for operational safety, compliance with environmental regulations and the overall security of assets. Schneider Electric's Telemetry and Remote SCADA Solutions address all of these critical requirements through flexible end-to-end integration and comprehensive feature sets.

Visit **www.schneider-electric.com/us**

Innovation at work

SCADA Expert ClearSCADA software – Providing functions to reliably and securely manage remote SCADA assets across a wide range of communication options, with easy integration into business systems.

Trio Data Radios – Ensuring data integrity over short and long-haul distances with versatile and reliable data transmission options.

SCADAPack Smart RTUs -The monitoring and communication capabilities of a Remote Terminal Unit (RTU) combined with the processing and data-logging power of a Programmable Logic Controller (PLC).

Accutech Wireless Instrumentation – Configurable startup and failsafe conditions, enhanced diagnostics and years of maintenance free operation.

Make the most of your energy℠

LaTech Equipment & Controls

As Represented by **LaTech Equipment & Controls**
UTAH • MONTANA • WYOMING • IDAHO • NEVADA
Contact: (801) 886-1145 Toll free (800) 801-3982
info@latechequipment.com www.latechequipment.com

Schneider Electric

FEATURES

Departments

The people make the difference

Jeff Beckman

First of all, I would like to express appreciation to those that help WEAU be a success. I would also like to especially thank Clint Rogers for serving as President this last year. Over the years Clint has served in various positions and has given countless hours helping run the organization. He has set a high standard to follow. Also, much thanks to Gary Vance and the Annual Conference Committee. Their hard work, along with the presenters, vendors, and sponsors, resulted in another great annual conference. And a special, thank you to the many sponsoring entities, cities, and districts that allow us the time and resources to serve the association. It truly is a team effort.

Speaking of the conference, a co-worker of mine recently attended the WEAU Annual Conference for the first time. He attends several conferences each year for other association's similar to ours. But he said that the WEAU conference was different than the others. He said that he wasn't sure what the difference was, but that he really liked the feeling at the conference. He noticed that everyone seemed to know each other and that everyone seemed to be friends. His comments have made me reflect why WEAU is different than the other associations. My conclusion was, IT IS THE PEOPLE that make the difference. WEAU is different than other associations because we are a completely volunteer organization. We do not have paid administration, which requires many people to help plan and carry-out activities. This volunteer approach not only helps keep costs down, but it also builds comradery. I can say this is true for myself. I have meet many people and made friendships as I have served in my various roles in WEAU.

> "IT IS THE PEOPLE that make WEAU a great organization.

I also noticed that members of WEAU are very supportive of each other. This is clearly evident in the Op's Challenge Event. Every year you can witness competing teams cheering and encouraging the other teams as they complete their challenge. It is also evident in the classes at the conference, as operators and engineers share their knowledge with each other, with the hope that everyone can become better at what we do. WEAU is truly an organization of good people that look out for one another.

I am convinced more now than ever, IT IS THE PEOPLE that make WEAU a great organization. I appreciate the opportunity to associate with each of you and look forward as we build upon the things of the past. Also, remember that this is your association and that we are always open to suggestions. Please contact me or any board member if you have recommendations or if you would like to get involved. Thanks for all you do. Let's make this another great year. DN

Thank you for your involvement

Chad Burrell

I hope everyone is enjoying warmer weather. Spring is a great time to get out of the house, do some yard work, go for a hike and attend conferences! Utah's Pretreatment Organization recently had their Region 8 Pretreatment Conference in Page Arizona. The WEAU also held their Annual Conference in St. George. You will find in this issue articles highlighting both of these events. The WEAU conference was a great time to come together and train as well as compete and recognize those that have made great achievements and accomplishments in their roles and responsibilities. Our organization is full of volunteers who step up and serve for the improvement of our industry, human health, and the environment. Thanks for everyone's involvement. DU

MACHINES FOR ALL YOUR NEEDS.

As you work to improve and build local communities, Wheeler Machinery Co. is committed to being a valuable community partner in the areas in which we live and work. Wheeler offers state contracts for the following equipment:

- Backhoe Loaders
- Skid Steer Loaders
- Excavators
- Compact Track Loaders
- Wheel Loaders
- Work Tools & Attachments

BUILT FOR IT.™

For more information, please contact:

Trevor Shuman, Governmental Sales Representative
tshuman@wheelercat.com | 801-209-1882

Wheeler CAT

wheelercat.com

THE WAIT IS OVER

THE FUTURE OF WASTEWATER TREATMENT IS HERE.

AquaNereda®

Following more than a decade of successful application worldwide, the AquaNereda® Aerobic Granular Sludge **Technology** is now available in the United States. This advanced biological treatment technology utilizes unique features of aerobic granular biomass including superior settling properties when compared to conventional activated sludge. Additional advantages translate into a flexible, compact and energy efficient process.

- Up to 75% Less Footprint
- Energy Savings Up to 50%
- Virtually No Chemicals Required for Nutrient Removal
- SVI Values of 30-50 mL/g and MLSS of 8,000 mg/l
- No Secondary Clarifiers, Selector Zones or Return Sludge Pumping
- Robust Process without a Carrier

Aqua-Aerobic Systems, Inc. is the exclusive U.S. provider of Nereda® technology developed by Royal HaskoningDHV.

AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company
www.AquaNereda.com | 815-654-2501

Represented by:

Davidson Sales & Engineering
DSE, Davidson Sales & Engineering
2441 South 3850 West, Site 'B'
West Valley City, Utah 84120
801-977-9200

2018 WEAU ANNUAL CONFERENCE

APRIL 17-20 | DIXIE CENTER | ST. GEORGE, UTAH

[RECAP]

2018 CONFERENCE AWARDS

INDIVIDUAL AWARDS

Collections Operator (Over 5 MGD)
Andy Morris

Collections Operator (Under 5 MGD)
Rob Jaterka

Young Professional
Andrew Hobson

Maintenance Specialist
Shawn Swenson

Collections Operator (Under 5 MGD)
Timothy Munden

Laboratory Technician
Missy Willes

Supervisor
Scott McPhie and Jared O'Brien

Operator (Over 5 MGD)
Mike Brown

Pretreatment Specialist
David Land

FACILITY/PROGRAM AWARDS

Pretreatment Program
Cedar City

Biosolids Program
Orem

2017 Excellence Award
Snyderville Basin Water Reclamation District and Central Valley Water Reclamation Facility

FACILITY/PROGRAM AWARDS continued

Collections System
Snyderville Basin Water Reclamation District

Laboratory
South Valley Water Reclamation

Safety Program
Snyderville Basin Water Reclamation District

Water Reclamation Facility
South Valley Water Reclamation

WEF Bedell Award
Chad Burrell

WEF Burke Award
Lonn Rasmussen

WEF Laboratory Analyst Award
Tiffini Adams

William D. Hatfield Award
Steve Williams

SSSSS Awards
Brandon Wyatt, Rob Jaterka, Dave Hatch, and Bryan Mansell

2018 GOLF TOURNAMENT RESULTS

1st Place: Net Score = 60
Scott Welding, John Raymond, Steve Spurlock, Tyson Parsley

2nd Place: Net Score = 61
Devan Long, Morgan Dudley, Dean Gibbs, Jeff Beckman

3rd Place: Net Score = 62
Ray Dotson, Jeff Ashment, Stephen Rohwer, Kerry Eppich

Long Drive
Scott Wendling, Drew Robinson, Marcia Hamblin, Angie Duke

Closest to Hole
Jeff Thomas, Stephen Rohwer, Jer Rawlings

OPERATOR CHALLENGE 2018

By Jeremy Deppe

We had another great year for the operators challenge competition. There were a total of 6 teams that competed this year.

Central Weber had an impressive showing as they took home 1st place in Maintenance & Collections and was the overall winner. Central Valley Water finished a very close 2nd overall. They took 1st in safety & 2nd place in Maintenance, Collections & Process. 3rd place overall went to North Davis. They took 1st in the Lab & Process events.

This year is probably the tightest we have ever been in the top three overall finishes

- Central Weber = 462.95
- Central Valley Water Rec. = 462.32
- North Davis = 462.22

As you can see it was a very close competition.

This year's competition would not have been possible if it was not for all the support we get from our managers, board members, judges, coworkers, sponsors, and the ops challenge committees and our WEAU board. There is a lot that goes into an event like this and I just want to say thanks to everyone. We could not do it without your help.

I would like to thank Marlo Davis for another year of great trophies. We look forward to what you bring to the table next year. (You thought you was done) I would also like to thank Josh Hunsaker for doing an amazing job as the Operator Challenge Chair for his first year.

As we move into a new year we will have two teams representing Utah in the Operators Challenge in New Orleans which will take place at the end of September. Central Weber will be sending there whole team and we will have one person from the remaining teams to make up the all-star team.

I would just like to say thanks again for everyone who participated and supported the operators challenge this year. See you all in New Orleans….

Central Davis 1st Place

Central Valley

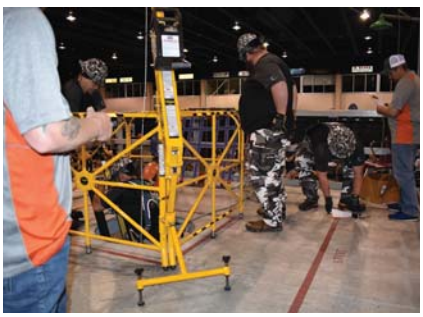
North Davis

Central Weber

Composite

Cottonwood

Snyderville Basin WRD



Dan (Kelly) Watts

Dan or (silverback) as his colleagues call him is the father of two amazing children. He is a great dad taking his son all around for the Pokémon Go game.

He has worked at Cottonwood Improvement District (CID) for thirteen and a half years. He is a Grade IV Collections Operator and runs a TV van. His childhood friend helped him get his job and he has never looked back. One of Dan's favorite projects to have worked on is cleaning big and little cottonwood canyons to see the beautiful scenery the canyons have to offer and take advantage of the cooler temperatures. Dan is grateful for the knowledge he has has gained in collection systems, through his experience. He would give any new employee the advice to learn as much as you can from whomever they get to work with.

Dan loves to eat Little Caesars Pizza not just one piece but the whole thing himself. He is the muscleman of Cottonwood, and loves midgets, and can't put down the Marvel game. He loves to tell you definitions of words that most people have never ever heard of. Dan will win anyone at a staring contest when he was a kid in karate he had to sit a whole practice and stare in the mirror for making faces at the mirror and the instructor, so he sat happily making faces at himself in the mirror the entire practice. He is good at karate and is a very accomplished football player.

Dan's first year participating in the Operator Challenge was in 2007. He has competed several times in WEAU and at the WEF national level. His favorite thing about the Operations Challenge is competing against friend he has made over the years of competition. He is a jokester, friendly, and very loyal his co-workers say and will help anyone at any time but be prepared to be made fun of the entire time he helps you. It has been my privilege to become friend with Dan Watts, he is funny and strong and

a fierce competitor. I was able to compete with Dan last year on the composite team that went to Chicago we had a great learning experience and had fun getting to know him and being friends. DN

Waste Water Process Questions

By Jeremy Deppe

1 What may be the result if the system tension pressure of a belt filter press is increased too much?
A. The floc size may be too small
B. The belts may blind
C. Gravity filtration will be too clear
D. The cake solids may be too high

2 Which type of chlorine only comes in liquid form?
A. Ferric chloride
B. Calcium hypochlorite
C. Sodium hypochlorite
D. Caustic soda

3 Which of the following lines are not used in transporting wastewater from its source in a home to the treatment plant?
A. House sewers
B. Lateral sewers
C. Trunk sewers
D. Storm sewers

4 What is the result of this formula? Total Solids - Fixed Solids =
A. Total suspended solids
B. Volatile solids
C. Fixed suspended solids
D. Settleable solids

5 What will organic material do in a muffle furnace?
A. It will burn
B. It will not burn
C. It will change to inorganic material
D. It will convert to dissolved solids

6 Which test indicates the amount of time it takes for sludge particles to float to the surface in the DAF process?
A. Rise rate
B. D.O.
C. Centrifuge spin down
D. Microscopic exam

7 What color may the digester gas be, as it is being burned in a waste gas burner, when the methane content is very low?
A. Yellow C. Green
B. Black D. Blue

8 What generally happens to the thickened sludge concentration if too much sludge is removed from the bottom of a gravity thickener?
A. It gets thicker
B. It gets thinner
C. Pumping has no effect on the thickened sludge concentration
D. The blanket gets deeper

9 What is the term that identifies the probable number of fecal coliform in wastewater effluent?
A. COD C. PH
B. MPN D. D.O

10 What is the amount of oxygen credit received for each ppm of nitrate used as a source of oxygen in the denitrification process?
A. 2.8 pounds C. 4.6 pounds
B. 3.6 pounds D. 7.2 pounds

ANSWERS:

1-B, 2-C, 3-D, 4-B, 5-A, 6-A, 7-A, 8-B, 9-B, 10-A

2018 MID YEAR CONFERENCE

CALL FOR PRESENTATIONS

2018 MID YEAR CONFERENCE
TUESDAY, NOVEMBER 13, 2018

The Water Environment Association of Utah (WEAU) is seeking presentation proposals for the technical sessions of the annual Mid Year Conference. WEAU **requests abstracts** of technical & non-technical presentations related to the following topics:

• Collection Systems	• Sustainability
• Biosolids	• Reuse
• Disinfection	• Human Resources
• Nutrient Removal	• Energy Efficiency
• Emerging Treatment Processes	• Odor Control
• Contaminants of Emerging Concern	• Utility Management
• Construction Management	• Public Outreach
• Funding/Financing	• Asset Management
• Operations/Maintenance	• Operator Certifications
• Operator Ingenuity – In-House Solutions to WWTP Problems	
Other appropriate topics will also be considered	

Abstracts will be accepted through online submission only at www.weau.org. Online entry will require:

- Name and contact information
- Topic and abstract (not to exceed 150 words)
- Brief bio to assist the moderator with introductions (in the case of abstracts that are accepted)

Abstracts will be reviewed and you will be notified if your presentation is accepted. The presentations will be made to attendees at the conference and formal paper submissions are not required.

Submission Deadline: Friday, August 10, 2018

Contact Brandon Wyatt at bwyatt@bowencollins.com with any questions.

WEAU is a member association of the Water Environment Federation (www.wef.org). WEAU is comprised of water quality professionals including utility staff, treatment plant operators, engineers, scientists, and planners working to preserve and enhance water quality. WEAU encourages anybody associated with work in water quality to submit an abstract for the mid year conference. The mid year conference typically has over 200 attendees and provides an opportunity to present important findings in the field of water quality to industry leaders and peers.

R8PA Annual

PRETREATMENT CONFERENCE 2018


Page, AZ

Region 8 Pretreatment Association held their Annual Pretreatment Conference May 8-10 in Page, Arizona. The training and networking opportunities were beneficial to all those who attended. The Opening Speaker, Lexi Woodward from the City of Page gave us some valuable information about the local activities and history. One important fact Lexi shared with us is that the coal power plant in Page will be closing December 2019. Al Garcia from EPA gave an update on EPA regulations, not that we like to hear that were will be more regulations that we have to adopt, but it is always better to have a heads-up instead of being blindsided. The Effluent Guidelines Program Plan was finalized May 2, 2018, for more information on this Plan go to *https://www.epa.gov/eg/current-effluent-guidelines-program-plan*. Al also discussed how the Nutrient removal at POTWs will affect Industrial Users. He suggested us to visit National Pretreatment Program Events, Training, and Publications website for events, training information and publications *https://www.epa.gov/npdes/national-pretreatment-program-events-training-and-publications*.

There was discussion about the Dental Amalgam Rule (40 CFR 441) which went into effect July 14, 2017. Just a reminder to all Pretreatment Programs, you need to have your Dental Discharger's One-Time Compliance Report approved by the Division of Water Quality, aka Jen, before you implement it. There was a discussion about Dental Inspections, inspections are not required by the regulation, although it is your decision if you perform them, just inform Jen if you plan on doing inspections. Many Pretreatment Programs are implement the regulations by arranging meetings with Dental offices, discussing the regulation, one-time compliance report and questions from the dental office. The compliance report can be filled out at the meeting or can be picked up at a later date.

The conference had great presentations regarding Local Limits, Inspections, EPA/CID Cases and Developing a Criminal Case. Overall, it was a great conference and Utah was well represented. The local Pretreatment Professionals from Utah, Spencer Parkinson, Jeff Macfarlane, Adam Butterfield and Brad Jones, need to have a huge round of applause for their efforts in putting together this conference. DN

Thinking about Bio-P?

By Paul Krauth

Thinking about Bio-P? then you should do the rbCOD test on your process

As with us! The type of food available will impact one's ability to do work. This is particular true when dealing with enhanced biological phosphorus removal (EBPR)

The workhorse bacteria in EBPR are the Phosphorus Accumulating Organisms (PAOs). Simply put these organisms discharge phosphorus in an anaerobic environment and take up phosphorus in an aerobic environment. As with all bacteria the PAOs need to consume carbon as an energy source.

Typically, we use either COD or BOD_5 to represent available carbon for the bacteria. But the PAOs need their carbon in a particular form, Volatile Fatty Acids (VFAs). Measuring VFA concentrations involved a mass spectrophotometer, most in-plant wastewater laboratories do NOT have this expensive instrument.

So, can a surrogate be used in place of VFA concentrations? With some limitations the VFA concentrations may be predicted by the soluble fraction of the readily biodegradable COD (rbCOD)

The rbCOD is the portion of COD that is truly soluble in the influent minus the portion that remains in the effluent.

To measure the soluble COD, the procedure called filtered flocculated COD (ffCOD) is used. This procedure used zinc sulfate to form a sweep floc at a high pH to capture the colloidal particles. Additional colloids are filtered through a 0.45-micron filter. After this prep run the standard COD test.

Filtered Flocculated COD steps.

1. Add 1 mL of 100 g/L zinc sulfate solution to 100 mL of raw wastewater
2. Mix vigorously for 1 minute
3. Using 6 M sodium hydroxide adjust the pH to approximately 10.5
4. Allow to settle for 10 minutes
5. Sample decant
6. Filter through 0.45 μm filter (Coliform filter)
7. Run standard COD test

The rbCOD this then just the influent ffCOD minus the effluent ffCOD

$$\text{rbCOD} = \text{ffCOD}_{influent} - \text{ffCOD}_{effluent}$$

Typically, a ratio of rbCOD to TP between 10:1 to 16:1 is needed for good Bio-P removal.

Tracking you rbCOD to influent phosphorus may provide more insight to your current or potential operation.

Note: the rbCOD is only an indicator if VFA formation is possible, temperature, and detention time in the anaerobic zones can have a greater impact VFA production. DN

A Bear of a Quiz #3. Know your Acronyms

By Paul Krauth, P.E.

1 The sum of the ammonia and ammonium concentrations
A. TAN C. TKN
B. TIN D. TON

2 The sum of the ammonia, ammonium, nitrite and nitrate
A. TAN C. TKN
B. TIN D. TON

3 The sum of the ammonia, ammonium and organic nitrogen
A. TAN C. TKN
B. TIN D. TON

4 The "non-treatable" form of nitrogen
A. DAN C. DKN
B. DIN D. DON

5 The filtered fraction of chemical oxygen demand
A. ffCOD C. SOD
B. rbCOD D. sCOD

6 The reactive form of phosphorus
A. dP C. rP
B. oP D. TP

7 Measurement of VFA potential
A. ffCOD C. SOD
B. rbCOD D. sCOD

8 Composed mainly of acetic, proprionic and butyric
A. Acd C. VA
B. Alk D. VFA

9 Bacteria that release phosphorus bonds for energy
A. AOBs C. NOBs
B. GAOs D. PAOs

10 Bacteria that do not release phosphorus bonds for energy
A. AOBs C. NOBs
B. GAOs D. PAOs

ANSWERS:
1-A, 2-B, 3-C, 4-D, 5- D, 6-B, 7-B, 8-D, 9-D, 10-B

The Highest Grade, Below Grade

Specification Test

YES/NO

☑ ☐ **ASTM F2561** - LMK's T-Liner® is an engineered, full-circle structural main-to-lateral connection. It renews lateral pipes in one continuous length up to 200 feet. This system can be installed with either polyester or epoxy resin. T-Liner is one of the highest grade, below grade, liner systems that meet ASTM F2561.

☑ ☐ **WATERTIGHT SEAL** - T-Liner, with a service life that matches the 50 year design life, uses molded ASTM F3240 compliant Insignia™ hydrophilic gaskets that swell when exposed to water creating a compression seal that prevents infiltration tracking between the liner and host pipe.

☑ ☐ **EXPERIENCED PROFESSIONALS** - C&L Water Solutions is a licensed LMK T-Liner installer and a UV-light cured CIPP lining industry leader, currently serving the excavation and trenchless rehabilitation needs of over 50 utilities and special districts throughout Utah, Colorado and the Pacific Northwest region. As a family-owned water distribution and sewer collection services company with offices in the Ogden, UT area, C&L is big enough to handle any job, small enough to care about every job. We are Utah's expert in providing highest quality, best value, holistic trenchless rehabilitation solutions.

LMK® TECHNOLOGIES
LMKTECHNOLOGIES.COM 815.640.9302

C&L WATER SOLUTIONS

303.791.2521
MAINTENANCE • TRENCHLESS • EXCAVATION
www.clwsi.com

Holistic Trenchless Rehabilitation for Collection Systems

Thinking Outside the Pipe

Holistic rehabilitation, defined as the strategic utilization of complimentary types of trenchless (no-dig) technologies applied in combination to achieve best value solutions to infiltration and corrosion problems in sewer pipelines, is becoming an important approach to improving collection system functionality. Instead of replacement, trenchless rehabilitation strategies that address the needs of the collection system as a whole and capitalize on efficiencies and asset management end goals, are quickly becoming the preferred approach for Utah wastewater utilities. Best value, minimal disruption, highest quality and longevity are the goals, not just a low price.

Effective pipeline asset management relies on detailed condition assessment information, sound engineering analysis, budgeting prioritization, and incorporation of viable rehabilitation or replacement strategies. Municipalities often identify problems such as infiltration and corrosion within their collection systems and take a limited approach to addressing these issues through disruptive and expensive dig and replace methods that only correct a small portion of the problem, or if they are aware of trenchless construction options, select a single method (i.e. CIPP lining or manhole rehabilitation) without consideration of the larger problem as a whole. By only utilizing one methodology or "tool from the toolbox", problems are often times shifted and infiltration and corrosion activity continue to plague other parts of the system nearby that were not replaced or rehabilitated. Although improvements were made, the problems continue to persist.

A common example of this can be seen with typical cured-in-place pipe (CIPP) or other pipe lining projects that are intended as standalone solutions to remediating infiltration problems. CIPP lining can provide an effective structural rehabilitation solution within a pipe segment, but does not effectively seal the collection system on its own. By design, CIPP lining is considered to be tight fitting but does not bond to the host pipe, and due to minor resin shrinkage inherent in all CIPP lining systems, a water jacketing effect can occur outside of the liner and will typically drive infiltration to the next available, nearest entry point, usually a lateral connection. In order to effectively seal a collection system, attention also must be given to lateral connections, manholes and other components. By including complimentary technologies such as ASTM F2561 compliant lateral lining, hydrophilic end sealing technologies, as well as chemical grouting, manhole rehabilitation and other trenchless methods, significant efficiencies are achieved, and the problem is truly solved. While raw cost may be somewhat higher initially by combining additional technologies, and/or utilizing higher quality rehabilitation products such as UV-light cured CIPP lining, highly effective solutions to infiltration problems are realized with a significantly greater long term return on investment. A multi-technology, total approach can capitalize on shared traffic control, bypass and flow management, and minimized disruption to the community while maximizing the return on money already allocated to these project-critical items.

> Understanding the strengths and limitations of various trenchless products and methods is critical.

Understanding the strengths and limitations of various trenchless products and methods is critical, as well as making sure an experienced contractor who is focused on quality rather than just low price is hired to do the work. By selecting the right approach and team of experienced experts, trenchless collection system rehabilitation provides the best value, longevity and highest return on investment. DN

Corey Williams and Lisa McFadden

Resources abound for understanding intelligent water systems

Intelligent water systems (IWS) are built to link together sensors, control systems, information management, and communications systems. They emphasize the water sector's opportunity to take advantage of advanced technologies and dramatically shift management decision making.

While there are varying ideas of what an IWS may be, there's not one singular definition. Some see the concept as a small piece to help in analyze and process data both historical and real-time data; others see this integration as an opportunity to overhaul their entire decision making or performance management approach.

How far each utility or facility chooses to take the IWS concept will vary, but many water sector organizations have produced resources to help guide these choices.

Key mechanisms

The Water Science & Engineering Center within the Water Environment Federation issued a technical report that identifies the key mechanisms needed for utilities to start and run a successful intelligent water systems program. Titled, *Intelligent Water Systems: The Path to a Smart Utility*, the report explores the following 10 topics.

- **Data prioritization** – First and foremost, utilities must decide what data is needed and how the data collected will fit into the ultimate strategy and goal of the utility. Data should not be collected for the sake of collection; collecting data takes time, staff, and money. The right data, at the right time, needs to be captured. This critical data must be accurate, complete, and aligned with business and operational management requirements.
- **Data governance** – Prior to data capture, system managers need to formulate a data governance approach. This includes identifying data stewardship, storage and access rights, and archiving and deletion protocols. For example, by deciding these responsibilities ahead of time, data processing issues can be ironed out. Developing a data management and governance plan also can help reveal gaps in the system.
- **Data capture** – This aspect is probably the most notable component of the process. With all the new and emerging technologies, utilities have vast options for how to capture data and how much to capture. With many new technologies promoting real-time data capture, it is important to note the difference between real-time data and data frequency. While *real-time data* deals with how quickly the user receives measured data, *data frequency* refers to how often the data is gathered.
- **Data validation** – With speed and an abundance of tools choices, data validation becomes an important component. While collecting data is easy, the goal is to be confident in the data being receiving.
- **Data processing, storage, and access** – Organize your data! Historically, data organization is sometimes forgotten. With newer platforms and easier accessibility, the storage, query, and transfer of data is now more manageable than ever. Data organization includes the formulation and upkeep of database table structures that fit the needs for analytics (as distinct from the database table structures for transaction processing).
- **Data integration** – By prioritizing and organizing data, users can integrate easier this data into existing systems and processes easier throughout the utility and networks. Remembering the prioritization and overall purpose of the data can help ensure they are being applied in a useful way.
- **Data analytics** – With Big Data come big opportunities. By incorporating data analytics, utilities can transform what's been collected into information. Utilities can choose many types of data analytics tools to use. The ultimate performance goal or outcome helps choose the right platform or tools to perform the analytics.
- **Business intelligence and decision support** – With the information provided, utility personnel can make operational and business decisions. By incorporating the information provided from the data analytics into modeling, optimization, and even predictive analysis tools, utilities can look at many different scenarios and find the best solution. By utilizing IWS, water sector agencies can get a big picture view, with the goal of making an informed decision. Theses decision support tools are not just for big capital improvement projects (CIP), but also can be applied to real-time situations and scenarios, through dashboards and cloud-based operations.
- **Knowledge sharing** – Once useful information has been attained, it can be integrated throughout the utility's system and utilized in cloud based systems, allowing the information to be centralized and used across all utility functional groups. By sharing information throughout a utility, data silos fall away. This enables all stakeholders to incorporate the same information into their decision-making processes. Further, data sharing can encourage its use for beneficial purposes that might not have been intended originally.
- **Performance reporting and visualization** – IWS is not always just for predictive and decision-making tools, it also can show how efficiently a water sector agency is operating. Coupling tool for performance data and visualization – such as interactive mapping or GIS, dashboards, or chart pop-ups – can provide useful insight into areas of need and improvement. Once performance gaps are identified via these visualization methods, water sector agencies can use optimization tools to improve operations,

reduce energy usage, lower costs, or develop adaptive master planning and CIP. IWS provides the data and information that utilities need to take a step back and look at where improvements may be needed.

IWS drivers

Similar to the concepts identified by WEF, the National Association of Clean Water Agencies (NACWA; Washington, D.C.) identified several IWS drivers. NACWA published these findings in the white paper, *Envisioning The Digital Utility Of The Future*. The paper lists eight drivers for utilities, which include

- reduce operational costs,
- manage and mitigate risks,
- enhance the customer experience,
- improve financial execution,
- optimize asset performance and uncover hidden value,
- leverage existing communications and computing platforms,
- maximize the engagement and efficiency of employees, and
- integrate water quality, policy, and performance.

Wanted results and simple framework

At the 2018 AWWA/WEF Utility Management Conference (UMC), participants in the workshop, Demystifying the "SMART" Utility, shared their opinions on where IWS can help most. Fully two-thirds of the attendees believed cost reduction and asset optimization to be the most important result of IWS implementation. Figure 1 (p. 27) shows the full results of their voting.

The Smart Water Networks Forum (SWAN) is a non-profit organization that seeks to be the leading global hub for the smart water sector. This group, a WEF partner, seeks to accelerate the awareness and adoption of data-driven technologies in water and wastewater networks worldwide. To help communicate the critical components of IWS, SWAN has developed a five-level framework to clearly define the components.

- The Physical level comes first. This includes components such as its pipes, pumps, valves, reservoirs, and tanks. As physical water infrastructure only, without data collection or analysis, this layer is often not considered "smart."
- The Sensing and Control level includes the initial components enabling IWS. These include sensors, meters, pressure-reducing valves (PRV), and automatic meter reading (AMR) and advanced metering infrastructure (AMI).
- The Collection and Communication level are technologies that enable storage and transmission of data. Examples include fixed cable network, radio, cellular, and Wi-Fi.
- Supervisory control and data acquisition (SCADA) system, cybersecurity, and customer information systems (CIS) and geographic information system (GIS) are prime examples of the Data Management and Display level.
- Data Fusion and Analysis is the ultimate IWS level. These technologies perform data analytics and modelling to help operators by assessing effects of changes, responding to them in real-time, optimizing operations, and planning for enhanced decision-making.

Based on these five levels, the same UMC workshop participants who identified cost savings and asset optimization as primary drivers, claimed that the largest resource gap existed at the Data Fusion and Analysis and Collection and Communications levels. The implications are that, in general, water and wastewater utilities appear to have SCADA (level 4) for data management and display and instrumentation and sensors (level 2) in place. However, the need to communicate the data from the sensors to management platforms and the lack of ability to perform analysis for enhanced decision-making are the areas of greatest needs to take full advantage of IWS. Figure 2 (p. 27) shows the workshops participants full opinions on the needs for IWS implementation.

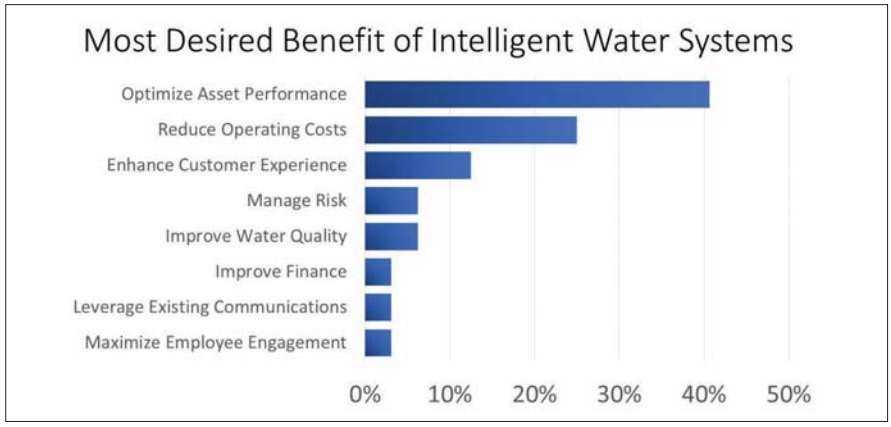


Figure 1. Most desired benefits of intelligent water systems

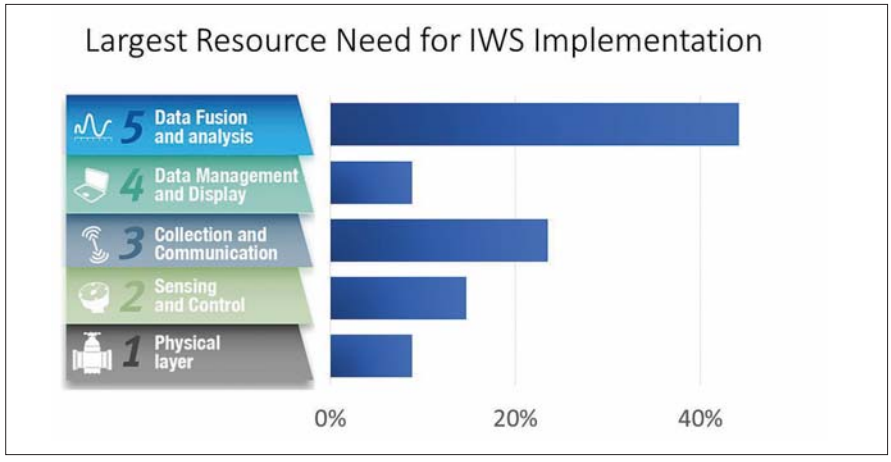


Figure 2. Largest resource needs for intelligent water system implementation

Changing workforce and skills

With the implementation of IWS, utilities will start to see a rise in the need for some new skillsets, including data science and data engineering. While current utility personnel may hone some of these skills, these are things that the utility engineer of the future will need to possess. It is important to make students aware of resources that exist outside the "typical" water engineering realm, and that is evident is the large mix of water personnel we are starting to see today. DN

Corey Williams is CEO of Optimatics (Overland Park, Kan.) and chair of the Interoperability Task Force for WEF's Intelligent Water Technology Committee. **Lisa McFadden** is director of Integrated Technical Programs and associate director of the Water Science & Engineering Center at the Water Environment Federation (Alexandria, Va.).

Patrick Dube

Understanding the effects of nutrient removal on dewatering

As states push nutrient discharge limits lower for water resource recovery facilities (WRRFs), utilities must implement different technologies to make sure they comply. While many different nitrogen (N) and phosphorus (P) removal technologies can help meet these limits, WRRFs must carefully select them to avoid unintended consequences on dewatering processes and costs.

Nitrogen removal

When it comes to N removal from waste streams, two methods are typically used, physicochemical (ion exchange, air stripping, etc.) and biological. Although both methods can remove nutrient, biological nutrient removal often makes more fiscal sense.

By using the natural nitrogen cycle of the bacteria in a WRRF, nitrogen is removed via nitrification–denitrification. Ammonia is transformed to nitrite (NO_2^-) and then nitrate (NO_3^-) during nitrification before a different set of bacteria transforms nitrate into nitrogen gas (N_2) during denitrification. The gas escapes into the atmosphere.

The entire process is driven by bacteria under either anaerobic or aerobic conditions. Oftentimes, these processes occur in separate tanks as nitrification is an aerobic process while denitrification is an aerobic process, but it can all be completed in one tank if anaerobic zones exist. Aside from aeration, nitrification–denitrification requires ample carbon for the bacteria to use as building blocks. Optimization of the process, important to achieve high removal, requires balancing temperature, dissolved oxygen, pH, and solids retention time. As shown in Figure 1 (p. 28), balancing carbon also is important. The carbon used for nutrient removal lessens the amount available for anaerobic digestion to generate biogas, and therefore, energy.

Phosphorus removal

Phosphorus removal presents a different challenge. Unlike N, P cannot be removed as a gas; instead, it must be removed as a solid. Many methods can remove P such as chemical, biological, combined chemical and biological and nano processes. Membrane filtration, including reverse osmosis, nanofiltration, and electrodialysis reversal all fall under the nano process category. Chemical methods rely on such chemicals as alum or ferric chloride to bind to phosphorus and precipitate it out as a solid, which can be collected. The quality and type of phosphorus precipitate is dictated by optimizing wastewater pH, chemical addition, mixing, and other factors.

Biological P removal uses anaerobic conditions followed by aerobic conditions to promote P uptake by phosphorus accumulating organisms (PAOs). Anaerobic conditions promote the consumption of volatile fatty acids (VFAs) by the PAOs, which forces them to release phosphorus. Once the PAOs switch to aerobic conditions, they uptake the released phosphorus as they replenish stores and multiply, resulting in more P removed than was released. The phosphorus-rich PAOs are then removed as settled solids, resulting in a low phosphorus liquid wastewater effluent.

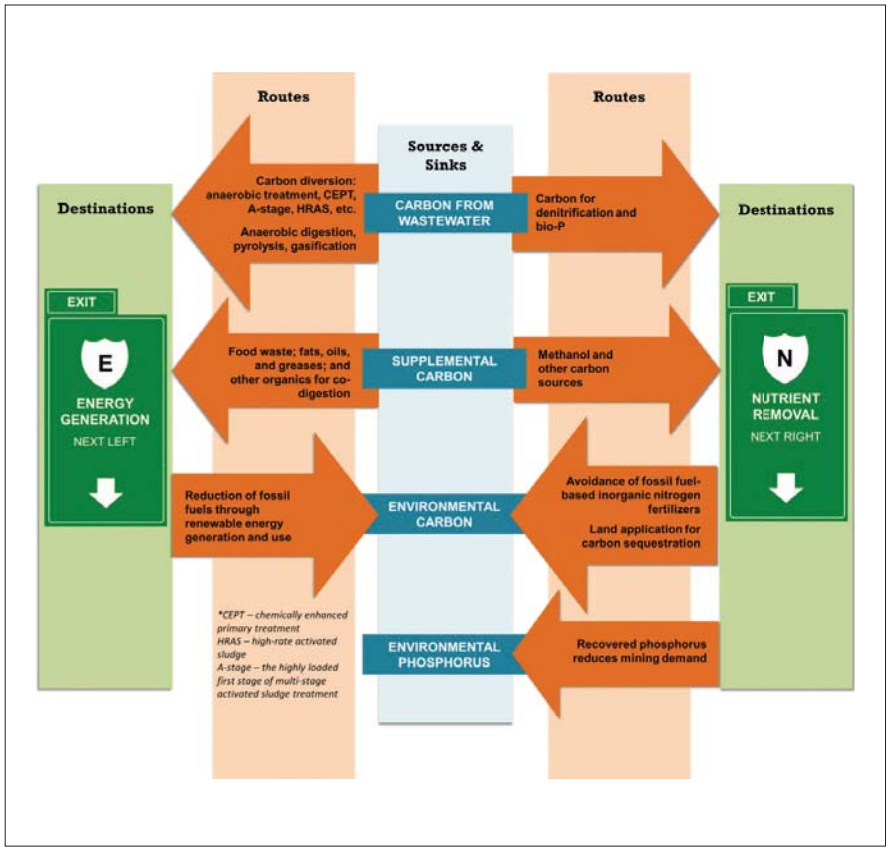


Figure 1. Both energy generation and nutrient removal require carbon

Effects on dewatering

It turns out that N and P removal also effect solids dewatering quite a lot. Figure 2 (p. 29) shows that nutrient removal can

"The research is not completely settled, and it is up to WRRFs to investigate the wide range of nutrient removal technologies available and see which can help meet their goals while maintaining high dewaterability."

hinder dewatering. This means using more polymer to get the same dewatering results; and increased costs for one of the most cost-intensive parts of treatment. A decrease in solids dewaterability by as much as 6% total solids leads to 2 to 3 times the polymer needed. Decreased dewaterability also means more cost to haul away the solids to landfills or composting or more fuel needed to incinerate the solids.

Nutrient removal in and of itself isn't the cause of poor dewatering performance as some methods such as nitrification–denitrification have no negligible effect. Studies and real-world performance show that specific types of phosphorus removal can directly affect dewatering. For example, chemical P removal can help with dewatering, while biological P removal hinders it.

When biological phosphorus removal is combined with anaerobic digestion and low-metal ions (iron and aluminum), dewatering efficiency decreases. This causes higher polymer demand and, therefore, increased costs. (See Figure 3, p. 29.)

Other studies have investigated the effect of biological phosphorus removal on dewatering and identified extracellular polymeric substances (EPS) as the culprit. EPS are released by anaerobic microbial communities. Dewatering decreased as the EPS content increased after anaerobic digestion, showing a correlation between the two and leading researchers to conclude that removing EPS may increase dewaterability.

Anaerobic digestion followed by aerobic treatment, using zero valent ions and other technologies has minimal effects on dewaterability.

The research is not completely settled, and it is up to WRRFs to investigate the wide range of nutrient removal technologies available and see which can help meet their goals while maintaining high dewaterability.

Balancing the scales

N and P removal are necessary for WRRFs to meet discharge limits and keep our environment safe and healthy. However, tradeoffs exist, such as the effects these technologies can have on dewatering. Each of these financial and operational implications must be considered. Each WRRF is a unique system and nutrient removal technologies must be chosen based on a such factors as influent flow and loading, economic considerations, and permit limits. DN

Patrick Dube is a technical program manager in the Water Science & Engineering Center at the Water Environment Federation (Alexandria, Va.). He manages the Residuals and Biosolids Committee and the Air Quality & Odor Control Committee. He can be contacted at *PDube@wef.org*

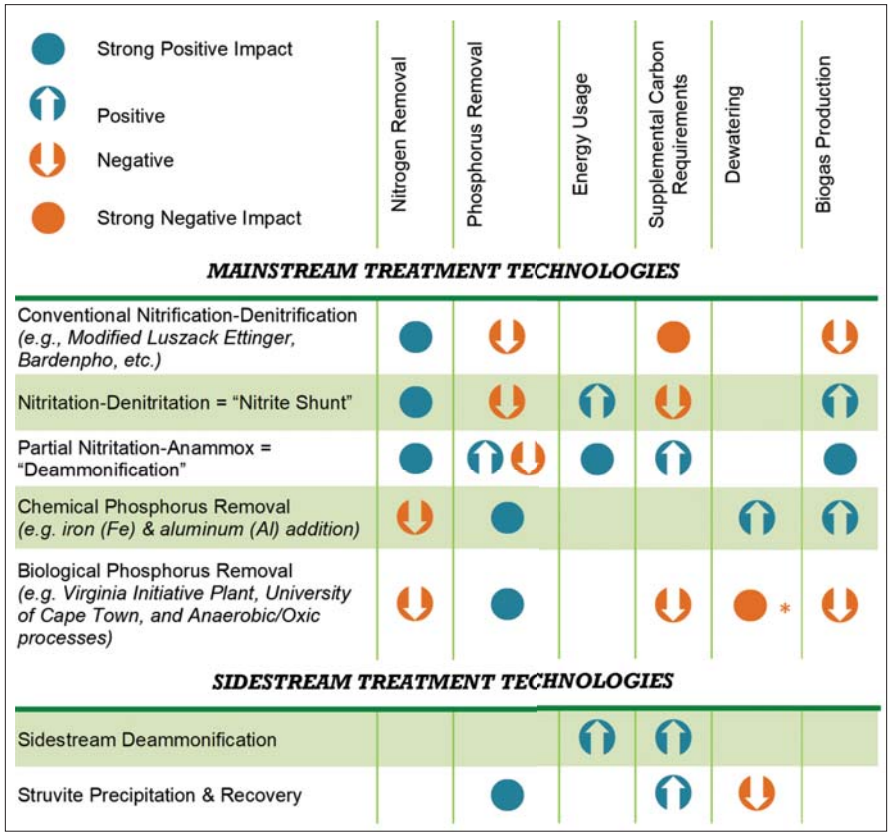


Figure 2. Interrelationships between N and P removal and other WRRF operations

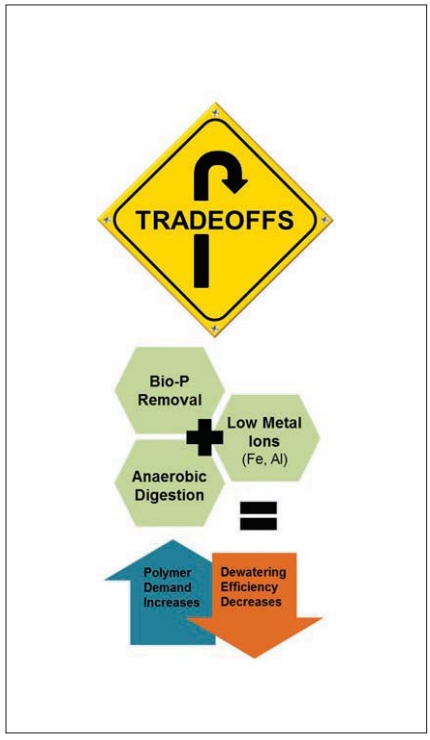


Figure 3. Biological phosphorus removal increases dewatering polymer demands

Corey Williams and Lisa McFadden

WEFTEC Operator Ingenuity Contest opens for 2018

WEFTEC® 2018 will host the seventh annual Operator Ingenuity Contest. Not all innovations come from a research lab. Sometimes, you need to tackle a persistent problem using just what's at hand and a big shot of ingenuity. The competition is open to all clever ideas related to

- treatment processes,
- maintenance practices,
- safety measures,
- collection systems,
- laboratory practices,
- stormwater,
- administration,
- human resources, or
- anything else associated with the water sector.

The bottom line: Even if you're not sure that your innovation qualifies, submit it.

Drawing inspiration from past winners

This contest has discovered about 40 award-winning fixes in its first 6 years. Entries are judged on safety, resourcefulness, and how transferable the ideas are. The criteria are kept simple to encourage all kinds of entries. Past winners have included painting buildings different colors to make deliveries easier, building a replica manhole, lateral, and cleanout cap to show customers how smoke inspections work, and a device to safely and easily lift the clarifier skimmer in the winter to prevent the skimmer from freezing to the grease box.

For some more inspiration check out all of the 2017 winners below.

Vacuum Virtuoso Award

Andy Loudermilk from the Bigfork (Mont.) Water and Sewer District received this award for his invention of the "scum sucker." Loudermilk repurposed an old rotary-lobed positive displacement blower into to vacuum to remove scum from the top of the facility's membrane bioreactor tanks and deposit it into the facility's solids holding pit.

Alternate Acid Activist Award

Zenon Kochan and Matt Seib from the Nine Springs Wastewater Treatment Plant in the Madison (Wis.) Metropolitan Sewerage District received their award for assembling a low-cost, safe, and efficient acid pumping system. Instead of carrying 25-kg (55-lb) bags of powdered acid to the top of a 10-m-tall (30-ft-tall) reactor, operators now use a portable pump that Kochan built to deliver a liquid acid directly into the process tankage.

Chemical Capture Chief Award

Mark Cataldo from Suez (Paramus, N.J.) and the Killingly Water Pollution Control Plant (Danielson, Conn.) earned his award for installing a trough to catch any spills during sodium hypochlorite deliveries. Catalado attached a simple trough to the wall beneath the inlet pipe to replace a bucket propped up with a board.

Thinkers Who Tinker Award

Kevin Barry, Jeff Leonard, and Jim Wilson from Woodard & Curran (Portland, Maine) and the Pinehills Wastewater Treatment Facility (Plymouth, Mass.) won for applying

Photo: Ops Ingen 2017 all winners.jpg
Credit: Oscar & Associates/Courtesy of Water Environment Federation
Caption: At WEFTEC 2017, the winners of the sixth annual WEFTEC Ingenuity Contest received their certificates and gave presentations on their "duct-tape fixes." Left to right are Andy Loudermilk, Matt Seib, Zenon Kochan, Mark Cataldo, Sidney Homer, Water Environment Federation Trustee Joan Hawley, Tomas Martinez, David Dedian (representing the Thinkers Who Tinker), Tony Hale, Jason Patty, and Pat Fountain.

the motto "work safer, not stronger" to find safer, more efficient approaches to routine tasks. Their changes include using davits and hoists throughout the facility to lift heavy equipment.

Root Assassin Award
Tony Hale from the Cottonwood Improvement District (Sandy, Utah) won for devising an in-pipe spot applicator for chemical herbicides. He built a floating rig that holds a camera and a swiveling nozzle to help deliver foaming root removal chemicals precisely where they are needed. This leads to halving the amount of chemical needed for the job.

Tidy Tester Award
Jason Patty, Ron McClure, Pat Fountain, Glen Holz, and Brad Gillis from the El Dorado (Kan.) Wetlands and Water Reclamation Facility received this award for building a simple and effective return activated sludge (RAS) sampling station. The operators plumbed the RAS line to a bucket, which has a hole in the bottom that is plumbed to the sump pit. Closing the drain valve on the bucket and opening the RAS flow line fills the bucket. Opening the bucket drain valve send the RAS into the sump.

Helpful Hitch Hand Award
Travis A. Fisher from the Ojai (Calif.) Valley Sanitary District won for creating a ball-hitch-mounted arm to hold spools of cable. The "bumper hitch reel" fits over the ball hitch on a truck and helps manage the cables associated with a pipe patch kit and a push camera.

The First Responders' First Responder Award
Sidney Homer and Tomas Martinez from the 69th Street Wastewater Treatment Facility (Houston, Texas) each received an honorary Operator Ingenuity award for ensuring services that enabled emergency response work following Hurricane Harvey.

New entry criteria for 2018

The submission process is a little different this year. In addition to up to five photos and about one page of text describing the problem you faced and the fix you found, we're asking you three questions:

- How transferable is it to other facilities or locations?
- How does this fix take safety into account?
- Where did the materials and any money used for the fix come from?

The entire submission process also will move to a more user-friendly platform. Visit *www.weftec.org/ingenuity* to get started.

Win, present, and publish

Selected inventors will be invited to give 10-minute presentations at WEFTEC 2018 in New Orleans. Submitters do not have to write a full WEFTEC paper. What you provide in your submission is all that is needed in writing for the contest. Even if you can't come to WEFTEC, submit your ideas. Award winners and select other entries will be converted into articles for the Operator Ingenuity section of Water Environment & Technology magazine. dn

Questions? Email us at *innovation@wef.org*.

Morgan Brown

LIFT program expands with Water Technology Innovation Clusters

The Water Environment Federation (WEF) is an avid supporter of innovation in the water sector. In fact, one of WEF's critical objectives is to "establish the conditions that promote accelerated development and implementation of innovative technologies and approaches."

As part of this initiative, WEF and The Water Research Foundation (WRF) jointly created the Leaders Innovation Forum for Technology (LIFT) program more than 5 years ago to help facilitate the adoption of water technologies and move innovation into practice.

For the newest addition to LIFT, WEF is coordinating a nationwide network of Water Technology Innovation Clusters, which were originally developed by the U.S. Environmental Protection Agency (EPA). The clusters program will be run as a LIFT focus group led by Bryan Stubbs, executive director of the Cleveland Water Alliance, and Aayushi Jain, market transformation associate for the Los Angeles Cleantech Incubator.

What are water clusters?

Water Technology Innovation Clusters are regional groupings of businesses, government, research institutions, and other organizations focused on innovative technologies to provide clean and reliable water. WEF will facilitate cluster communications, advise cluster organizations, enable collaboration among clusters, and identify water programs that support cluster activities.

Clusters have a key role to play in addressing the nation's pressing water issues.

- **Spur innovation.** Clusters create a situation where companies and organizations can easily share ideas and solutions.
- **Accelerate the development of new technologies.** Connections within clusters lead to partnerships between businesses and researchers, facilitating the transfer of new technologies to the market.
- **Streamline the adoption of new technologies.** Clusters provide companies with easier access to test beds and partners for pilot studies and encourage communication among companies and regulators.

Building on past efforts

While the program is a new addition to LIFT, the clusters have been involved in WEF's Technical Exhibition and Conference (WEFTEC). For the last several years, the Water Technology Innovation Clusters, under the auspices of EPA, had a formal meeting at WEFTEC and have been showcased in several sessions within the WEFTEC Innovation Pavilion.

In 2017, cluster leaders from the New England Water Innovation Network (NEWIN), Current, The Water Council, and the Los Angeles Cleantech Incubator participated in a lively panel discussion titled "How can I benefit from a water innovation cluster?" Panelists talked about how clusters support pilot projects, foster collaboration among utilities and universities, and link entrepreneurs with advisors and customers.

Also at WEFTEC 2017, an Innovation Pavilion session, titled "The Water Council's BREW (Business – Research – Entrepreneurship – in Wisconsin) Accelerator," held a business-pitching session modeled after the successful show "Shark Tank." BREW participant companies pitched for 3 to 5 minutes, after which a panel grilled them about their business model, technology, intellectual property, marketing strategy, and more. Nothing was off limits in these lightning fast pitches.

In a third session, the Cleveland Water Alliance discussed the Erie Hack, which is Lake Erie's first water innovation competition. The Cleveland Water Alliance partnered with DigitalC, a civic tech collaboration organization to hold this competition. The Erie Hack brought together more than 100 partner organizations and 200 participants – coders, developers, engineers, data experts, and water professionals – from nearly every major city around the lake to work on its greatest challenges, especially harmful algal blooms.

As a follow-up to the Erie Hack, the Cleveland Water Alliance branched out into another water innovation competition, the Internet of H2O Challenge. This competition seeks to leverage next-generation networking and sensor technology to monitoring and managing nutrients in Lake Erie and beyond. The goal was to generate robust and resilient nutrient monitoring pilots with the potential to scale across the Great Lakes. The alliance partnered with DigitalC as well as US Ignite, which spurs the creation of next-generation applications and smart cities, and the National Science Foundation. Other participants include the Great Lakes Observing System, IBM, City of Sandusky, Bowling Green State University, Heidelberg University, AT&T, U.S. EPA, Great Lakes Commission, NOAA, Limnotech, and others to focus the Erie Hack's energy on developing a resilient monitoring system for nutrients.

Moving innovation forward

Water Technology Innovation Clusters are uniquely making a difference at a local and regional level. Even though each cluster is a separate entity located in various regions, this overall program brings together the cluster leaders so that they can work on a larger national scale.

For example, the cluster leaders previously have worked together to produce such reports as *Overcoming Barriers to Water Innovation in the U.S. and Building a Successful Technology Cluster*. These resources are beneficial not only to existing clusters, but also to those seeking to create a cluster in their region.

WEF is excited to take on this program set up by EPA and to continue to build valuable innovative programs for our members through LIFT and the WEFTEC Innovation Pavilion. For more information on the Water Technology Innovation Clusters program visit *www.wef.org/techclusters*. dn

Morgan Brown is Water Innovation Cluster manager at the Water Environment Federation (Alexandria, Va.). She can be reached at *mbrown@wef.org*.

Tideflex® Technologies

CHECKMATE® APPLICATIONS: SIMPLY VERSATILE!
Along with a complete line of check valves

ODOR CONTROL

Lightweight CheckMate® Inline Check Valves prevent sewer systems' offending odors from escaping, while still allowing water to discharge when needed. The CheckMate® Valve is designed to eliminate the backflow of unwanted methane and hydrogen sulfide gases that typically result in complaints about odor from the general public.

DRAINAGE AND OUTFALL LINES

CheckMate® Inline Check Valves have become a frequently specified solution for commercial and residential areas where complete, dependable backflow prevention is necessary. The CheckMate® Valve's maintenance-free, passive operation provides years of trouble-free service – even when the valve is partially buried.

INTERCEPTOR AND MANHOLE INSTALLATIONS

CheckMate® Inline Check Valves are used for interceptor and manhole installations because they are ideal for preventing water from backflowing into a sewage treatment plant. The CheckMate® Valve's innovative inline design allows it to be installed without modifications to structures such as interceptors, manholes and vaults.

STORMWATER RUNOFF

The CheckMate® Inline Check Valve is the valve of choice for both municipalities and commercial property owners in stormwater and general drainage applications. Because the CheckMate® Valve utilizes dissimilar elastomers and fabric in the hinge area, there are no mechanical parts to warp or corrode. It is maintenance-free!

TF-1 CHECK VALVES

The Tideflex® TF-1 Curved Bill Check Valve is designed with enhanced sealing to improve headloss. The improved TF-1 design allows the valve to handle long-term water weight while maintaining structural integrity. The spine is at a greater vertical angle, making it able to withstand the cantilever effect when water is flowing through the valve. The TF-1 is contructed of rubber, making it immune to rust, corrosion and weathering.

SERIES 35-1 CHECK VALVES

The flat-bottom Series 35-1 features an integral rubber flange, allowing them to be mounted to flanged outfall pipes or directly to headwalls where the pipe is flush. The flange size drilling conforms to ANSI B16.10, Class 150#, or can be constructed with DIN, 2632 and other standards. The Series 35-1 Check Valve is furnished complete with steel or stainless steel backup rings for installation.

SERIES 39 CHECK VALVES

The Tideflex® Series 39 Inline Check Valve features a fabric-reinforced elastomer check sleeve housed in a cast iron body with ANSI 125/150 flanges, allowing for easy installation into any piping system. The valve's operation is silent, non-slamming and maintenance free. Sliding, rotating, swinging and plunging parts are completely eliminated. The body is equipped with flush ports and a clean-out port and can be epoxy coated.

FCE FLOW CONTROL EQUIPMENT

RAY YELLAND
Flow Control Equipment – Tideflex Technologies
10291 S. 1300 East, Suite 140, Sandy, Utah 84094
P: (801) 571-0304 F: (801) 576-5617 C: (801) 550-2896
flowcontrolequipment@hotmail.com

CALL TO SCHEDULE TECHNICAL AND EDUCATIONAL PRESENTATIONS TO YOUR GROUP.

Represented by:

Davidson Sales & Engineering
DSE, Davidson Sales & Engineering
2441 South 3850 West, Site 'B'
West Valley City, Utah 84120
801-977-9200

APG Neuros

APG-Neuros offers sustainable and affordable high efficiency turbo blowers and aeration systems for municipal and industrial customers. With approximately 1200 units installed and over 120 on order, our installations enjoy the highest success with large cities including Washington D.C., NYC, London (U.K.), Vancouver (B.C.), City of Toronto (ON) and Mexico City. APG-Neuros provides clients with the most proven product supported by strong engineering and a well-established service network throughout North America and Europe.

Our high speed turbo blower is considered the industry leader for high efficiency and quality. APG-Neuros product superiority is attributed to the application of the most technologically advanced and proven components from the aerospace industry such as the air bearing, permanent magnet synchronous motor and programmable logic controller (PLC) based aeration control system. Customer benefits include energy savings of up to 35%, elimination of heat rejection, vibration-free operation, noise reduction, smaller footprint, and lower installation costs compared to conventional products.

◀ Washington D.C. - 12 Blowers - NX150-C100

www.apg-neuros.com

Looking to Carry Your License to Other States? WEF Is Working to Pave the Way

It's no secret that waves of operators are retiring and that water and wastewater utilities need replacements. It's also no secret that operators wish they weren't constrained in their mobility by state-by-state licensing and certification.

Reciprocity in licensing would help both sides. Ideally, a license earned in one state would be recognized in the other 49. The reality is, to say the least, a bit more complicated. Different states have their own sets of criteria, their own programs, their own exams. States may differ greatly in what skills, for example, a Class 1 (or Grade I) operator needs to have.

Still, that's no reason to give up on reciprocity, proponents say. Now the Water Environment Federation, through its Operator Advisory

Panel, has started the slow, meticulous process of working to increase reciprocity. The same panel is also working on other initiatives to advance operators' training, job opportunities, and prestige.

One member of the panel is Joan Hawley, P.E., principal of Superior Engineering in Muskego, Wisconsin. Hawley has a master's degree in civil engineering and a Wisconsin Grade 4 wastewater operator license; she also holds a Professional Operator credential in collections from the Association of Boards of Certification, or ABC. Hawley is a WEF trustee and past chair of the WEF Collections Committee. She talked about reciprocity and the Operator Advisory Panel's other activities in an interview with Treatment Plant Operator.

TPO: What is the basic structure and role of the Operator Advisory Panel?

Hawley: The panel is almost a think tank, and it has specific positions. It is led by Mike Kyle, executive director of the Lancaster (Pennsylvania) Area Sewer Authority. I serve on it as a WEF board member. The vice chair of the board's Plant Operations and Maintenance Committee and the vice chair of the Operations Challenge are members. We also handpicked experts from across the United States as well as one from Canada. Our goal is to make sure WEF is doing its best to serve operators.

TPO: What are the main priorities of the panel?

Hawley: Reciprocity is a big one. Another is workforce development, which includes training programs, but also communication and outreach – promoting our profession through public information and toolkits for schools and targeting veterans and underrepresented groups.

TPO: Why is reciprocity so important for operators?

Hawley: Operators are a lot more mobile nowadays. Many operators who are retiring now have been in their positions for 30 or 40 years. That used to be the norm, but now people are moving around. They're changing jobs more. They want to be able to go from state to state and take their license with them. They say, "I worked hard. I studied. Why do I need to take the exams over and over?" Or people from rural areas move away, earn their credentials in another state, and then want to come back to their hometown.

TPO: How can reciprocity benefit utility management?

Hawley: I've talked to utility managers who say they're desperate for key operators and staff. Their operators are retiring. Prospective replacements are moving into the area, but getting them the credentials they need is really critical. Another issue that is rumbling about is that the person in charge at a facility – the person who signs on the permit – potentially can face liability in a manner similar to a Professional Engineer, or P.E., in charge who has to stamp the drawings. It's really important for utility managers to raise the level of professionalism to be able to pull in qualified people from different areas.

TPO: Why are some states reluctant to accept other states' licenses?

Hawley: For one thing, regulatory agencies each have their own licensing entities. They developed the programs, and they take pride in them. Why would they want to take somebody else's? Also, in the old days, maybe the quality of some states' testing requirements weren't very good. States look at each other suspiciously; people bring things up that happened 30 years ago, not realizing that times have changed. In addition, operator classifications are kind of a hodgepodge. One state will have Grades 1 through 4. Another has Class A through D. Some states have Class 1 to 5. Sometimes 4 or 5 is the highest, and sometimes 1 is the highest.

> "We're not promoting that everyone has to use ABC, but we'd like people to consider using it or consider reciprocity to be the norm."

TPO: What general approach is WEF taking toward developing reciprocity?

Hawley: We are partnering with ABC, which was created by WEF and the American Water Works Association in 1972 as a separate entity to provide operator certification. ABC has been a game-changer in how they put their programs together. They have gone through and defined Class 1, Class 2, Class 3 and Class 4 and the hours of experience, hours of classes, and job skills required for each one. They've standardized all that. A lot of states use part of ABC. Some states already use all the ABC tests. We're not promoting that everyone has to use ABC, but we'd like people to consider using it or consider reciprocity to be the norm.

TPO: Are there examples of full reciprocity in water-related professions?

Hawley: I use the example of the P.E. credential. As a P.E. in Wisconsin, I can essentially fill out a form and pay a fee and I'm a P.E. in another state. In Canada, the English-speaking provinces use ABC for all their testing, and operators can easily go from province to province. The French-speaking province of Quebec works closely with the other provinces to provide reciprocity.

TPO: How much reciprocity already exists?

Hawley: It's kind of confusing. Each state has its own process. Some states automatically recognize operators from certain other states. Some use ABC but then they tack on additional requirements, or they might revise some of the ABC tests. We're trying to get away from that so the ABC test is standardized.

TPO: Do you envision reciprocity helping to drive up salaries for operators?

Hawley: I would hope that it would help bring them up to a level of pay commensurate with their competency. I see some cases where the pay is probably acceptable, but in some cases, it's not commensurate with their skill set. The skill sets that are needed today, even at the basic level, are a lot more extensive than many people know.

TPO: What needs to be done to encourage more reciprocity among states?

Hawley: It's going to take a lot of one-on-one with the state agencies, getting people to recognize that this is a significant problem and they need to be part of the solution. It also takes bringing ABC to the table to say, "Here's our program. Here's what we've changed. Here's our offering." As state funding is cut and jobs are cut, maybe some states will see that adopting ABC isn't a bad idea because they don't have the manpower to run their own programs anymore.

TPO: How quickly do you envision full reciprocity becoming a reality?

Hawley: I would love to see every state turn around in the next year and say, "We're on board with this," but we have to face all the challenges I've mentioned. For some states, it might be a matter of utility managers insisting on reciprocity because otherwise they're not able to get the quality of people they need.

TPO: Turning to another priority, what is driving the emphasis on workforce development?

Hawley: At WEF, we deal with a lot of utility executives who see a grinding need for sophisticated operators. Our treatment plants for some 50 years were activated sludge – the same philosophy and the same technology. Now with nutrient recovery, energy efficiency, sophisticated instrumentation, and automation, we need a whole different kind of operator. Even small plants are increasingly sophisticated. We need top-notch operators out there.

TPO: What are a couple of examples of what WEF is doing for training?

Hawley: We've created an On-Demand Wastewater Library – an OWWL. It's free for WEF members and includes short items, five to seven pages – information in bite-size segments. Operators want quick segments or videos that show them how to do things. We're also creating training manuals more focused on operators. For example, we're taking the WEF Manual of Practice that was written for design engineers and putting it in a format where it's going to be easy for operators to understand. That manual will be available in spring 2018.

TPO: What needs to be done with public outreach and education as it relates to the stature of operators?

Hawley: We need to do a better job at promoting our profession. We're not patting ourselves on the back and saying, "Look at all this great work we're doing." You can't outsource our water and wastewater jobs. We have to be at the plant and be around the collections system. We do what is probably one of the most important jobs – keeping our water clean. dn

Reprinted with permission. Article originally ran in the March 2018 issue of Treatment Plant Operator magazine.

"You can't outsource our water and wastewater jobs.
We have to be at the plant and be around the collections system.
We do what is probably one of the most important jobs – keeping our water clean."

2018
WEAU SUMMER PICNIC

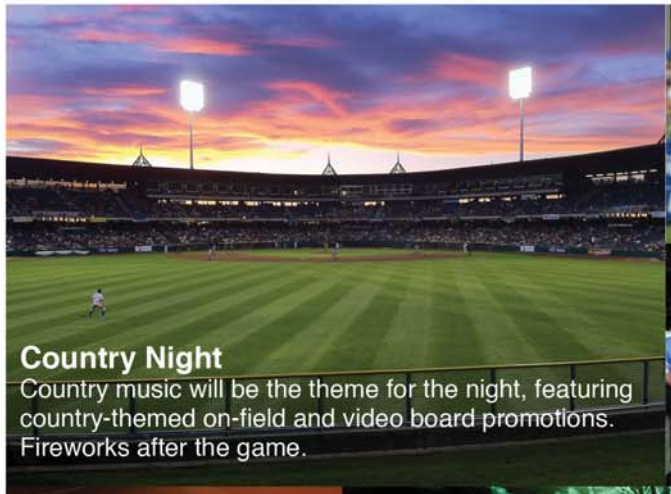
FRIDAY JULY 27
SALT LAKE BEES VS. THE NASHVILLE SOUNDS

SALT LAKE BEES

Come on down to the ballpark to enjoy a picnic & summer baseball game with our group

SAVE THE DATE

MINOR LEAGUE BASEBALL



Country Night
Country music will be the theme for the night, featuring country-themed on-field and video board promotions. Fireworks after the game.

Friday/Saturday Post-Game Kids Run
Kids 12 and under can run the bases after every Friday and Saturday home game. Post-Game Kids Run is presented by Bees Kids Club.

Purchase tickets by going to WEAU.ORG. Ticket sales will go live on May 16 at 12 PM and are limited to a first-come-first-serve basis. Prices are $10 per ticket.

Hot dogs, hamburgers, and drinks will be served. Prizes will be raffled during the game.

Contact Ben Skousen with questions: bskousen@brwncald.com

SALT LAKE BEES SALES CONTACT • KOY PRUITT 801-350-6907

Young Professionals Breakfast

By Marianka Sochanska

Several of the breakfast club crew were able to stick around for a photo.

The Annual Conference YP Breakfast was held at the Black Bear Diner. We had a wonderful turnout of 15 people including students, professionals, and a WEF delegate, Rahkia Nance. It is always a wonderful opportunity to get to meet others in our field and have a good breakfast before the conference.

If you are interested in joining our mailing list for the YP activities, please email *ypweau@gmail.com* with your contact information. EVERYONE is welcome to join us at our events! DN

Utah State University team takes food waste to WEFTEC

WEAU and local universities have shared a partnership with the student design teams for almost ten years. During that time, the University of Utah, Brigham Young University, and Utah State University have competed in varying degrees for the trip to WEFTEC, with compliments and encouragement of our Utah member association. This year provided a high quality team from Utah State University. Team members included Dominque Bertand, Ben Sandberg, Jade Snyder, Avery Holyoak, Todd Keniry.

This year's competition started with a problem statement which focused on the food waste and digestion master plan for the Central Valley Water Reclamation Facility. The team met at the CVWRF for a design kickoff and site tour led by Phil Heck.

While only one team submitted for judging, it is important that WEAU be well represented at WEFTEC. To help verify the preparation of the team, a presentation of their design was judged in April ahead of the annual conference. Approximately 15 people were in attendance including the judging panel and representatives from CVWRF. The judges were thoroughly impressed by the technical and presentation skills demonstrated by the team and recommended they present at the WEAU annual conference.

Those who attended the presentation during the annual conference were impressed by the design concepts and the overall quality of the presentation. The judges recommended to the board that the team be sent to WEFTEC to represent WEAU at the national competition. This year's judging panel included Mike Sorensen (Waterford Systems), Lance Wood (Central Weber SID), Gary Vance (J-U-B Engineers), and Jill Jones (Central Davis SD).

Special thanks to Phil Heck and CVWRF for hosting the event and being a resource to the students throughout the process with plant tours, data sharing, and question answering. A special thanks also to faculty advisor Dr. R. Ryan Dupont for mentoring the students through the process.

WEAU congratulates the team and wishes them the best of luck as they compete at WEFTEC. DN

Blood Drive at WEAU Annual Conference

By Marianka Sochanska

Andrew Hobson and one of the wonderful Red Cross nurses prepping for his blood draw.

The annual Blood Drive took place on Thursday, April 19th from 10 am to 3:30 pm. The Red Cross (*redcross.org*) was able to collect 39 pints (31 Whole Blood; 8 Power Reds) from **38 presenting donors**!!! Our goal this year was 25 pints so we surpassed it! In fact, we tied our previous record of donations set in 2013. A HUGE thank you to everyone who came and donated! dn

We tied our previous record of donations set in 2013. A HUGE thank you to everyone who came and donated!

Watch the Heat

By Lonn Rasmussen

1 How much water should each employee be drinking in an hour when working in hot temperatures?

A. 16oz C. 28oz
B. 22oz D. 32oz

2 Temperature plus relative humidity together is known as?

A. Heat Schedule
B. Heat Index
C. Weather Index
D. Weather Saturation Schedule

3 List 3 personal risk factors that make you more susceptible to heat issues?

4 The process of your body adjusting to heat is?

A. Acclimatization
B. Heat Saturation
C. Heat Indexing
D. Customization

5 List 2 signs or symptoms of heat illness?

6 Heat rash is more likely to occur where on the human body?

7 Heat syncope is also known as what?

A. Heat Exhaustion
B. Heat Cramps
C. Fainting
D. Heat Stroke

8 Where should ice packs be placed on someone with a heat related problem?

9 List other places heat can be a factor?

10 What should you do if you or a coworker are showing signs of heat related problems?

The WEAU Collection Committee is in need of training ideas. The hardest part of putting on a training is coming up with a topic. Please help us out if you have an idea, let us know and we can arrange everything from there. Send your ideas to Brent Packer at *bpacker@bowencollins.com*

ANSWERS:

1. D 2. B
3. Weight, Blood Pressure, Age, Medications et.
4. A
5. Cramps, Heat Rash, Heat Exhaustion, Heat Stroke
6. Neck, Upper Chest, Groin, Armpits, Elbow Crease
7. C
8. Behind the Neck, Armpits, Groin Area
9. Inside Vehicles, Hot Tubs, Desert
10. Try to get out of the hot environment, Drink cool liquids if you can, Rest, Seek medical help if needed.

2017-2018 WEAU Sponsors	Level
Aqua Engineering	Premier Platinum
Bowen Collins & Associates	Premier Platinum
Brown & Caldwell	Premier Platinum
C&L	Premier Platinum
Carollo	Premier Platinum
Jacobs	Premier Platinum
JUB	Premier Platinum
Olympus	Premier Platinum

2017-2018 WEAU Sponsors	Level
Pipeline	Premier Platinum
Stantec	Premier Platinum
Waterworks	Premier Platinum
Blue Stakes	Premier Silver
AWAL Annual	Silver
Thatcher Annual	Silver
Utility Management	Systems Annual Silver
Stanley	Annual Conf. Platinum

Our concern for the environment is more than just talk

As we continue to deliver valuable information through the pages of this magazine, in a printed format that is appealing, reader-friendly and not lost in the proliferation of electronic messages that are bombarding our senses, we are also well aware of the need to be respectful of our environment. That is why we are committed to publishing the magazine in the most environmentally-friendly process possible. Here is what we mean:

- We use lighter publication stock that consists of recycled paper. This paper has been certified to meet the environmental and social standards of the Forest Stewardship Council® (FSC®) and comes from responsibly managed forests, and verified recycled sources making this a RENEWABLE and SUSTAINABLE resource.
- Our computer-to-plate technology reduces the amount of chemistry required to create plates for the printing process. The resulting chemistry is neutralized to the extent that it can be safely discharged to the drain.
- We use vegetable oil-based inks to print the magazine. This means that we are not using resource-depleting petroleum-based ink products and that the subsequent recycling of the paper in this magazine is much more environment friendly.
- During the printing process, we use a solvent recycling system that separates the water from the recovered solvents and leaves only about 5% residue. This results in reduced solvent usage, handling and hazardous hauling.
- We ensure that an efficient recycling program is used for all printing plates and all waste paper.
- Within the pages of each issue, we actively encourage our readers to REUSE and RECYCLE.
- In order to reduce our carbon footprint on the planet, we utilize a carbon offset program in conjunction with any air travel we undertake related to our publishing responsibilities for the magazine.

So enjoy this magazine... and keep thinking green.

Digested News would not be possible without the advertising support of these companies and organizations. Please think of them when you require a product or service. We have endeavoured to make it easier for you to contact these suppliers by including their telephone number and, where applicable, their websites.

Company	Page Number	Telephone	Website
(AE2S) Advanced Engineering and Environmental Services, Inc.	10	801-331-8489	www.ae2s.com
Airvac - Aqseptence Group	3	813-855-6297	www.airvac.com
Ambiente H2O	34	801-532-4812	www.ambienteh2o.com
Aqua Engineering	41	801-299-1327	www.aquaeng.com
Ashton Tucker	19	801-290-5757	www.ashtuck.com
Biolynceus Biological Solutions	35	970-586-3391	www.biolynceus.com
Bowen Collins & Associates, Inc.	31	801-495-2224	www.bowencollins.com
Brown and Caldwell	22	801-316-9800	www.brownandcaldwell.com
C&L Water Solutions	24	303-791-2521	www.clwsi.com
Carollo Engineers	8	800-523-5826	www.carollo.com
ChlorTainer	35	800-543-6603	www.chlortainer.com
Coombs-Hopkins	23	801-990-3174	www.coombshopkins.com
COP Construction	43	801-298-9556	www.copconstruction.com
Davidson Sales & Engineering	12, 33	801-977-9200	paul_mora@dseslc.com
EJ	8	303-286-8014	www.ejco.com
Engineering America	8	970-962-9400	www.engamerica.com
Flow Control Equipment	33	801-571-0304	flowcontrolequipment@hotmail.com
Forsgren Associates, Inc.	36	801-364-4785	www.forsgren.com
Goble Sampson Associates	5	801-268-8790	www.goblesampson.con
InfoSense, Inc.	8	877-747-3245	www.infosense.com
LaTech Equipment & Controls	6	800-801-3982	www.latechequipment.com
Mountainland Supply Company	2	801-224-6050	www.mountainlandsupply.com
Nickerson Company	21	801-973-8888	www.nicopumps.com
Penn Valley Pump Company, Inc.	17	800-311-3311	www.pennvalleypump.com
Pipeline Inspection Services, Inc.	18	208-465-3444	www.pipelineinspectionservices.com
Pittsburg Tank & Tower Maintenance Co.	21	270-826-9000	www.watertank.com
Rocky Mountain Valves & Automation	44	801-438-1038	www.rckymtnvalve.com
SKM Inc.	30	801-677-0011	www.skm.com
Smith & Loveless Inc.	5	800-898-9122	www.smithandloveless.com
Sunrise Engineering Inc.	9	801-523-0100	www.sunrise-eng.com
Twin "D" Environmental Services	17	801-771-3038	www.twind.net
Val Kotter & Son's	39	435-734-9598	www.valkotterandsons.com
VEGA Americas, Inc.	4	513-272-0131	www.vega.com
Wheeler Machinery Co.	11	801-974-0511	www.wheelercat.com

COP TRENCHLESS
A DIVISION OF COP CONSTRUCTION

COP Construction is excited to announce the addition of trenchless services to COP Construction's portfolio. It is the mission of COP Trenchless to uphold and exhibit the Core Values of COP Construction in providing safe, quality and innovative solutions to our clients. The COP Team includes some of the most passionate and experienced people in the industry. Our dedication to excellence and strengthening our relationships with clients continues to enhance our reputation as a premier heavy civil contractor in the Intermountain West. Some of the services that COP Trenchless provides are:

- **Pipe Bursting**
- **Slip Lining**
- **HDD - Directional Drilling**
- **Jack and Bore**
  Pipe Ramming | Auger Boring | Pilot Tube Guided Installations | Tunnel Boring

Please contact us for all your trenchless and heavy civil construction needs or if you have a project in design we would be glad to work with you through that process. You can contact us at:

801.298.9556 ext. 2131

www.copconstruction.com

VAL-MATIC® *Your Valve Experts*™

50 Years of Wastewater Experience!

Cam-Centric®
Plug Valve

Cam-Centric®
100% Port
Plug Valve

Swing-Flex®
Check Valve

ROCKY MOUNTAIN
VALVES & AUTOMATION, INC.

Serving the MUNICIPAL industry with Valves & Automation

rotork®

IQ3 Multi-Turn Actuators

- Three-Phase, direct current and single-phase variants
- Advance, multilingual display for status and setup
- Detailed datalogging
- Setting and data capture via *Bluetooth*® handheld tool
- InSight2 PC software for valve performance analysis
- Highly intuitive user interface
- Comprehensive control and flexibility

Rocky Mountain Valves & Automation, Inc.
1310 S. Swaner Road, Salt Lake City, UT 84104
P: 801-438-1038, F: 801-438-1039 • www.rockymtvalves.com

Stock available Utah & Idaho warehouses!