

SPRING
2017

The Official Publication of the Water Environment Association of Utah



DIGESTED news

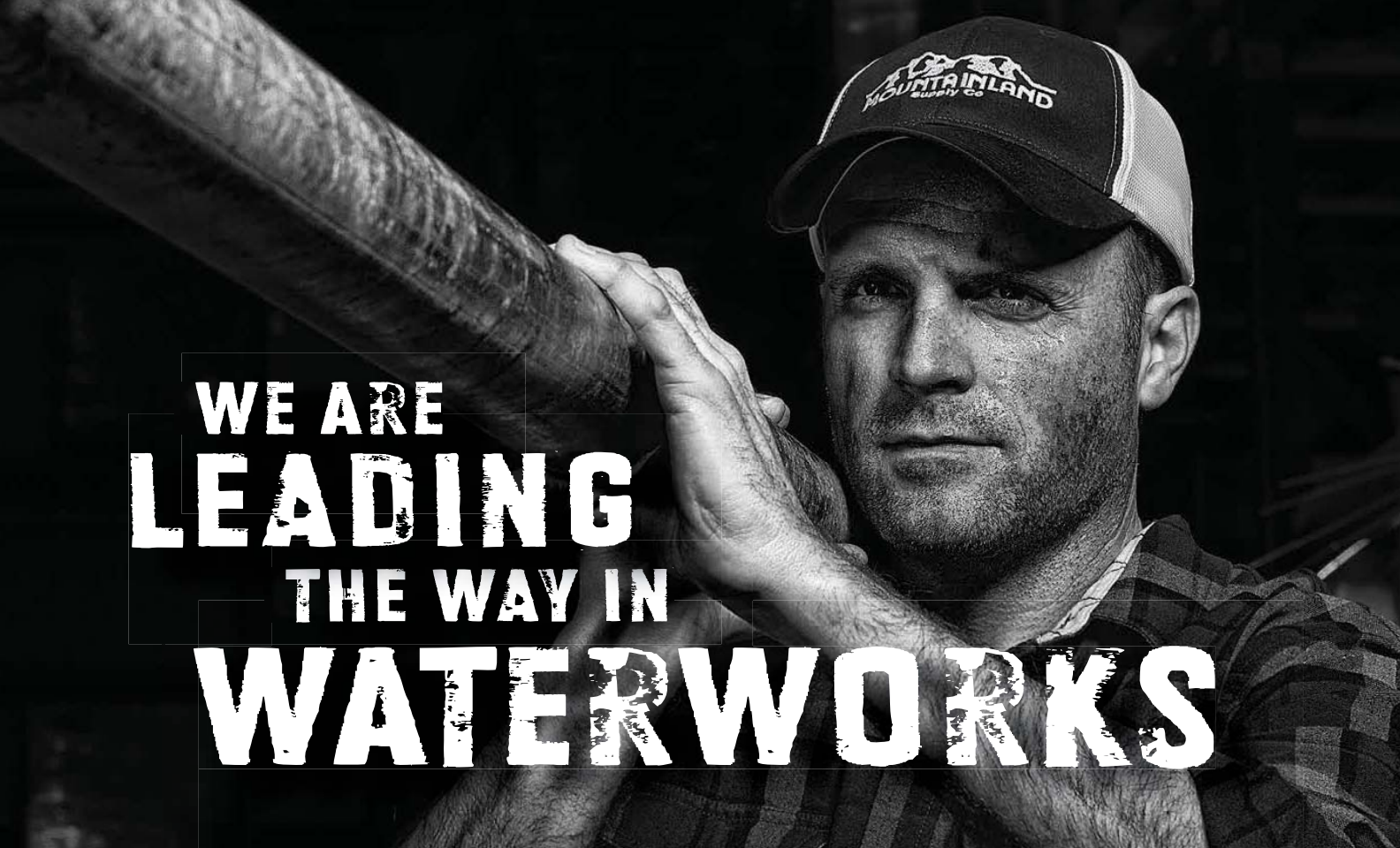
Celebrating 50 Years of Clean Water

2017 WEAU Annual Conference April 18-21 – Dixie Center – St. George Utah *Preview*

Snyderville Basin Water Reclamation District
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INSIDE:

Algae: From Resource Depletion to Resource Recovery ■ Baby Boomers Leaving the Workforce



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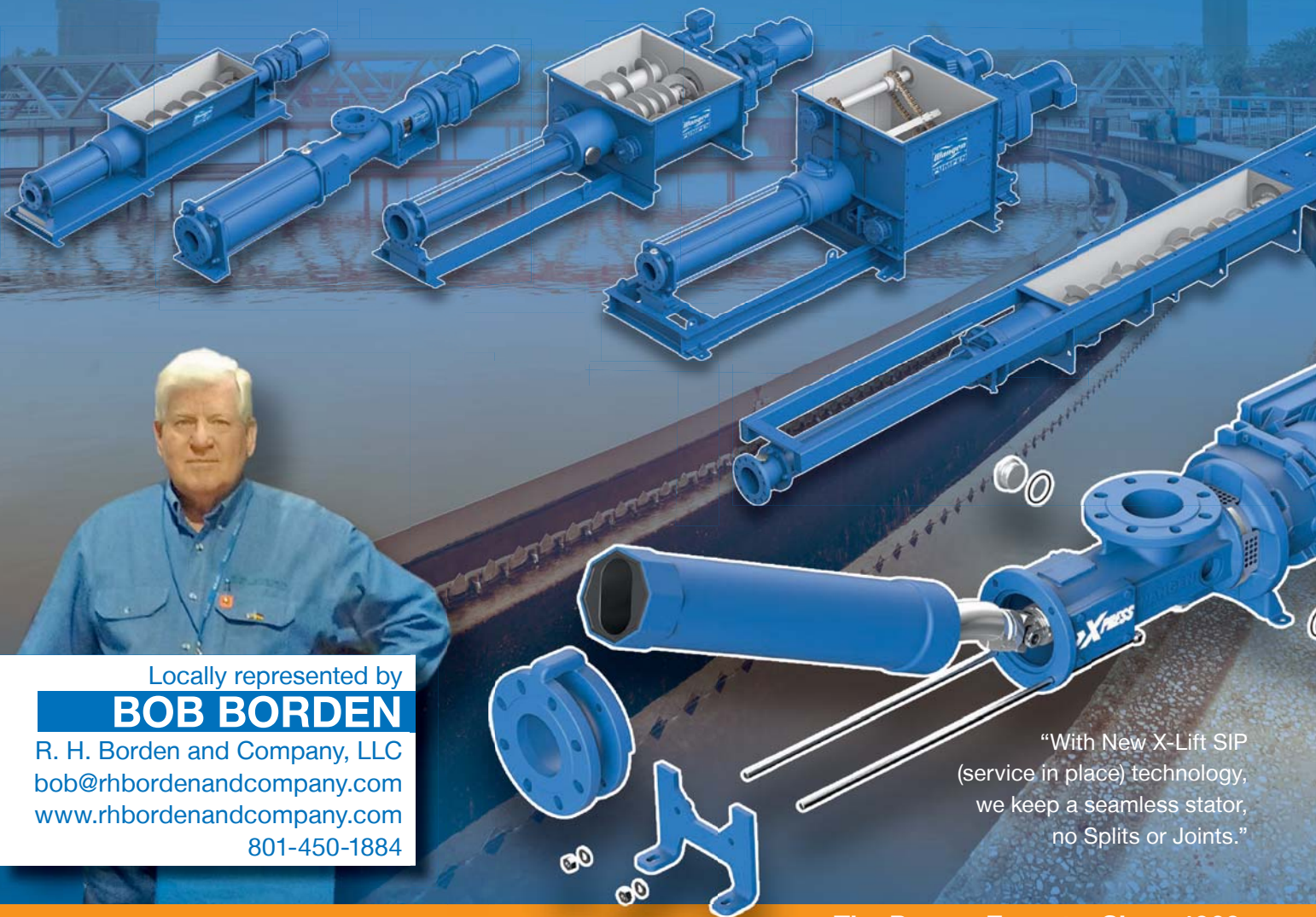
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Looking Forward

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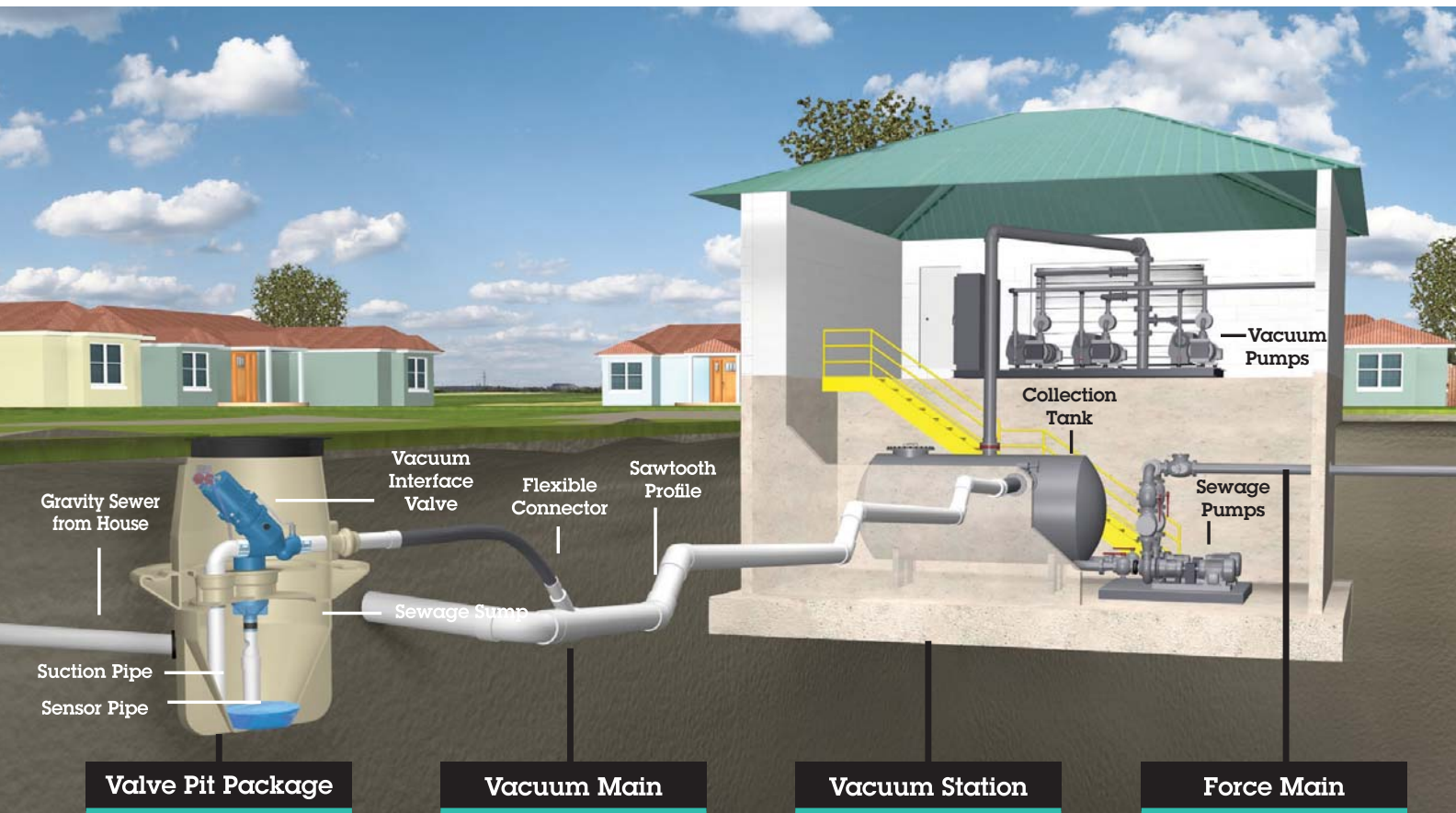


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WEAU 2017 Conference

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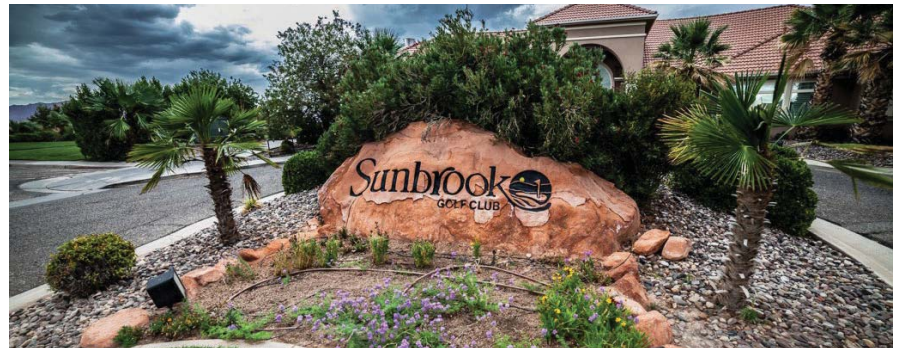
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Matt Myers

Thank You and Conference Time

Well, if time flies when you're having fun, then I guess this past year must have been wild, because I'm not sure where it's gone already. The annual conference is coming up on the 3rd week of April (check the website) and let this message be a formal invitation to come and enjoy the festivities.

This is my last message as President, and I'm finally out of neat and interesting stuff to say. This may come as a surprise to those of you who are thinking, "Wait, did he really write anything neat or interesting?!" ...well no, but hear me out on this last one, because mostly all I want to say is thank you for the great things that you do.

I am talking to you. Yes you! I am continually impressed with the willingness that you folks have in our Association to dig in and work. I am happy to be a part of this culture that has been cultivated within WEAU since before my involvement. I am grateful for the seasoned individuals in the association who have blazed trails for us to follow. I am grateful for those who are young and/or new to the association and bring



in fresh perspectives and willingness to contribute. Let me say thank you again.

Finally, this quarter in the *Digested News* it is customary to vigorously endorse the annual conference, so here goes: Please come to the annual conference!

There. I have discharged my duty. The annual conference is a great place to maintain and strengthen professional relationships as well as make new ones. It is a great place to learn a few new things. Please come and participate. We need you there! [Dn](#)

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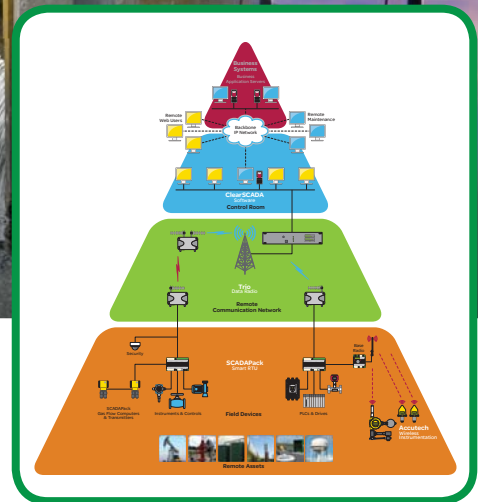
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Quarter Century Operators Club

Chad Burrell

I wanted to take this opportunity to recognize Utah's three newest members of the Quarter Century Operators Club.


- Blaine Boyer
- Brent Justensen
- Gary Hill

The Quarter Century Operator Club recognizes operators of wastewater treatment facilities for their service and dedication in a difficult and dangerous profession. The Club was created under the sponsorship of **Frank Woodbury Jones**, who served as the Club's first registrar.



Eligibility Requirements

- Member of WEF for a minimum of five consecutive years immediately preceding application.
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- Completed and signed application.

I would like to thank these professionals for their many years of service. 



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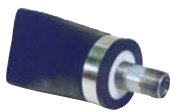
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2017 WEAU ANNUAL CONFERENCE PREVIEW



APRIL 18-21 | DIXIE CENTER | ST. GEORGE UTAH



WEAU PRE-CONFERENCE WORKSHOP

APRIL 18, 2017
8:00 AM - 1:00 PM

WORKSHOP TITLE: ASSET MANAGEMENT IN MODERN WASTEWATER TREATMENT PLANTS

Coordinator: *Dr. Ramesh Goel*, Civil & Environmental Engineering, University of Utah

-
- 8:30 am: Introduction opening speech:** An overview about the workshop and introductions of speakers.
Dr. Ramesh Goel, University of Utah
-
- 8:45 am: Presentation 1: 14 years of Asset Management - A Small Utility's Approach to Asset Management;**
By *Mike Leurs*, General Manager, Snyderville Basin Water Reclamation District
-
- 9:30 am: Presentation 2: Mobile technology optimizes asset management practices;**
By *Mr. Vincent Yee*, President of NEXGEN Asset Management, License professional civil engineer, BS Civil Engineering, MBA, Consultant for over 28 years and specializes in asset management program implementation.
-
- 10:15 am: Break:** Thirty minutes tea/coffee break
-
- 10:45 am: Presentation 3: Integrating CMMS Asset Inventory with Asset Plans to Forecast Asset Funding Requirements;**
By *Mr. Vincent Yee*, President of NEXGEN Asset Management, License professional civil engineer, BS Civil Engineering, MBA, Consultant for over 28 years and specializes in asset management program implementation.
-
- 11:30 am: Presentation 4: Proactive Financial Management: Recommended Best Practices;**
By *David Robertson*, Lewis Young Robertson & Burningham, Inc.

Draft Technical Program Schedule

Wednesday	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
8:30 - 12:00	Water Quality Board Meeting - Garden Room						Exhibitor Challenge Ongoing Exhibits Open
SESSION A Wednesday, April 19	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
		Safety/Risk Management	Utility Management	Collections	Nutrients	Operations	
	Moderator - TBD	Moderator - TBD	Moderator - TBD	Mod. - Lonn Rasmussen	Moderator - TBD	Moderator - TBD	
1:30 - 2:05	Closed	Safety, Past, Present and Future <i>Curt Simmons</i>	Closed	Collection Line Rehabilitation by Pipe Bursting in Bend Oregon <i>Victor Godfrey</i>	Chemical or Biological Phosphorus Removal - Which Path is Right for You? <i>Tanja Rauch-Williams</i>	You Can't Improve What You Don't Measure: Focusing on Key Operating Parameters <i>John Rickerman</i>	Exhibits Open
2:10 - 2:45	Closed	Avoiding the Liabilities that arise from contracted work <i>Brian Child</i>	Sandy Suburban Improvement District Sewer Lateral Insurance Case Study <i>Regina Davis</i>	Holistic Trenchless Sewer Rehabilitation: Winning with Multiple Technologies <i>Jeff Maier, PE</i>	Fundamentals of Nutrient Removal in Wastewater Treatment Process <i>Sunayna Dasgupta</i>	The WHERE and WHY of instruments for BNR <i>Steve Myers, PE</i>	Exhibits Open
2:45 - 3:30	Break - Exhibit Hall						
	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
		UASD Training	WWTP Design	Collections	Nutrients	Operations	
3:30 - 4:05	Closed	Accountability Through Incident <i>Doug Folsom</i>	From Sludge to Soil - Dynamic Energy Tools Lay the Foundation for Energy Efficiency <i>Eric Auerbach</i>	Trenchless Elevated <i>Mike Kobe</i>	Upgrade Strategies for Compliance with New Nutrient Effluent Limits <i>Nathan Brown</i>	Level Measurement Made Easy and Maintenance Free in Lift Stations, Chemical Tanks and other areas in your plant and collection <i>Steve McCuskey</i>	Exhibits Open
4:10 - 4:45	Closed		Improvement of Anaerobic Sludge Digestion using Biological Enhancement Technologies - Case Studies <i>Jonathan Lee</i>	An Overview of Tunneled Crossings for the South Platte Interceptor <i>Steve Kuehr</i>	Enhanced Biological Phosphate Removal and Nutrient Recovery System Optimization at the West Boise Wastewater Treatment Facility <i>William Leaf</i>	Integrating SCADA and Information Systems to Operate More Efficiently <i>Jacob Young</i>	Exhibits Open

SESSION B THURSDAY, APRIL 20	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	WWTP Design	Water Quality	Sustainability	Collections	Nutrients	Operations	
	Moderator - TBD	Moderator - TBD	Moderator - TBD	Moderator - Dakody Gines	Moderator - TBD	Moderator - TBD	
8:30 - 9:05	Recent Innovations in Wastewater Treatment <i>Henryk Melcer</i>	Update on DWQ's efforts for revising Utah's Ammonia Criteria <i>Chris Bittner</i>	Making the Most Out of the "H" in CHP <i>Peter Zemke</i>	Accurately Measuring Flow Rates in Your Collection System <i>Brent Packer</i>	Water Quality Models for Establishing Site-Specific Nutrient Goals Based on Water Quality and Biological Response <i>Renn Lambert</i>	Operator Math Class - Grade 1 and 2 Operators <i>Sharon Burton</i>	Exhibits Open
9:10 - 9:45	Bonnybrook WWTP 360 MGD Headworks Facility <i>Chris Mountenay</i>	DWQ Update on Implementing the Water Quality Strategy for Great Salt Lake <i>Chris Bittner</i>	Advantages of On-Site Generation of SO ₂ -Bisulfite for Dechlorination <i>Marcus G. Theodore</i>	Master Planning Process and Wastewater Hydraulic Modeling <i>Kameron Ballentine</i>	Nutrient Recovery from Central Valley Water Reclamation Facility <i>Simmi Chahal</i>		Exhibits Open
9:45 - 10:30	Break - Exhibit Hall						
	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	WWTP Design	Water Quality	Laboratory	Collections	Nutrients	Operations	
10:30 - 11:05	Pilot Testing Implications on Mechanical Dewatering Design <i>Sean O'Connell</i>	Cyanobacteria and Cyanotoxins in Utah Lake <i>Hanyan Li</i>	Who Needs Quality Control Anyway? <i>Aimee Matthies</i>	Sealing the Collection System with a Focus on Main to Lateral Connections <i>Michael Jereb</i>	Minimizing Mixing Energy in BNR Activated Sludge Selector Basins <i>Jim Fischer</i>	Operator Math Class - Grade 3 and 4 Operators <i>Sharon Burton</i>	Exhibits Open
11:10 - 11:45	Teamwork Leads to a "Solid" Job for Miami-Dade <i>Brittany Radke</i>	Lake Eutrophication. Where, Why, How - is it Good or Bad? <i>LaVere B. Merritt</i>	WET Testing in Utah - What's New? <i>Lee Rawlings</i>	Lateral Rehabilitation <i>Dean Ayala</i>	Anaerobic Process for Mainstream Carbon and Nitrogen Removal for Energy Efficient Wastewater Treatment <i>Aditi Podder</i>		Exhibits Open

SESSION C THURSDAY, APRIL 20	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	Innovative Equipment	Water Quality	Misc. WW Topics	Collections	Nutrients	Operations	
	Moderator - TBD	Moderator - TBD	Moderator - TBD	Moderator - Dean Ayala	Moderator - TBD	Moderator - TBD	
1:30 - 2:05	Velocity Control Advancements in Vortex Grit Removal Demonstrates High Removal Efficiency Results <i>William Flores</i>	Is an Integrated Watershed Management Approach a Viable Alternative to Simply Meeting End-of-Pipe Limits? <i>Jeff DenBleyker</i>	Microbial Source Tracking, A Unique Approach to Microbial Pollution in Water Bodies <i>Ahmed Karimi</i>	Life Cycle Cost Assessments of Pressure Sewer Systems <i>Keith McHale, PE</i>	When Biological Phosphorus Removal is Not Enough – Evaluating Filtration Technologies Coupled with Chemical Treatment to Meet Low Limis <i>John B. Richardson</i>	Coagulant Addition and Digester Gas at the Orem City WRF <i>Lawrence Burton</i>	Exhibits Open
2:10 - 2:45	Advanced PC Pump Technology <i>Bob Borden</i>	Moving Forward on the Phase II Jordan River TMDL <i>Theron Miller</i>	Validation of a Framework for Evaluating the Potential Effects and Risks of Trace Organic Compounds (TOCs) to Your Aquatic Life <i>Justin Ibershoff, PE</i>	Estimating and Construction Considerations for Sewer Pipeline Construction from a Contractor's Perspective <i>Quinn Hamson</i>	Beat Ultra-Low Phosphorus Targets with Reactive Filtration: How Citronelle, Alabama Consistently Hits 20 Micrograms per Litre <i>CJ Strain</i>	Istewtrcidentifying and Managing Industrial Discharges to Wastewater Treatment Facilities <i>Nathan Zaugg</i>	Exhibits Open
2:45 - 3:30	Break - Exhibit Hall						
SESSION D FRIDAY, APRIL 21	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	Innovative Equipment	Financial Planning	Misc. WW Topics	Collections	Nutrients	Operations	
	Moderator - TBD	Moderator - TBD	Moderator - TBD	Moderator - Pete Duberow	Moderator - TBD	Moderator - TBD	
3:30 - 4:05	Central Davis Digester Cover: How a Membrane Cover can be Installed Quickly and Under Budget <i>Brian Mitchell</i>	Proactive Financial Management: Recommended Best Practices <i>David Robertson</i>	Traceability in Whole Effluent Toxicity Testing <i>Laura Shealy Davis</i>	Pipe Cleaning, Efficiently & Economically <i>Curtis Craig</i>	Choppy Water for Utah's Lagoon Treatment Systems, Francis Case Study Navigates a Path Forward <i>Luke Thoman</i>	Aerobic Granular Sludge <i>Manuel de la Santos</i>	Vendor Breakdown
4:10 - 4:45	Water and Waste Water Energy Optimization <i>Joe Baughman</i>	Maximizing Your Retirement <i>Jeff Draper</i>	Hydrogen Sulfide Odor Control Using Chemistry <i>Jeff Zidek</i>	Sewer Lift Station Assessment and Replacement <i>Alex Tabb</i>	Can Algae Growth be a Feasible Option to Reduce Excess Nutrients in Wastewater Effluents? <i>Anwar Alsanea</i>	Primary Filtration Using Cloth Media <i>John Dysen</i>	Vendor Breakdown

SESSION D FRIDAY, APRIL 21	Sunbrook A & B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	Moderator - TBD	Moderator - TBD	Moderator - Pete Duberow	Moderator - TBD	Moderator - TBD	
	8:00 - 8:55	WEFTEC Design Competition Student Paper Presentation	Closed	Closed	Closed	
9:00 - 9:40	Policy or Science: Where Does One End and the Other Begin? <i>Leland Myers</i>	Closed	Operator Challenge Process Test Review <i>Sharon Burton</i>	Existing Sewer Mains & Sewer Lateral Connection Alternatives <i>Clint Dilley</i>		-
9:45 - 10:25	DWQ Regulatory Update <i>Walt Baker, DWQ Staff and Others</i>	Closed		The Microbial Induced Corrosion Process in Concrete Sewer Structures <i>Jason Allen</i>		-
10:30 - 11:15		Closed	Closed	Collection System Jeopardy <i>Michael Foerster</i>		-



You're Invited! 2017 WEAU Annual Golf Tournament

FORMAT

Four-person scramble

WHEN

Tuesday, April 18, 2017
Shotgun start at 1:30 pm

WHERE

Sunbrook Golf Course
St. George, Utah



GREEN FEES

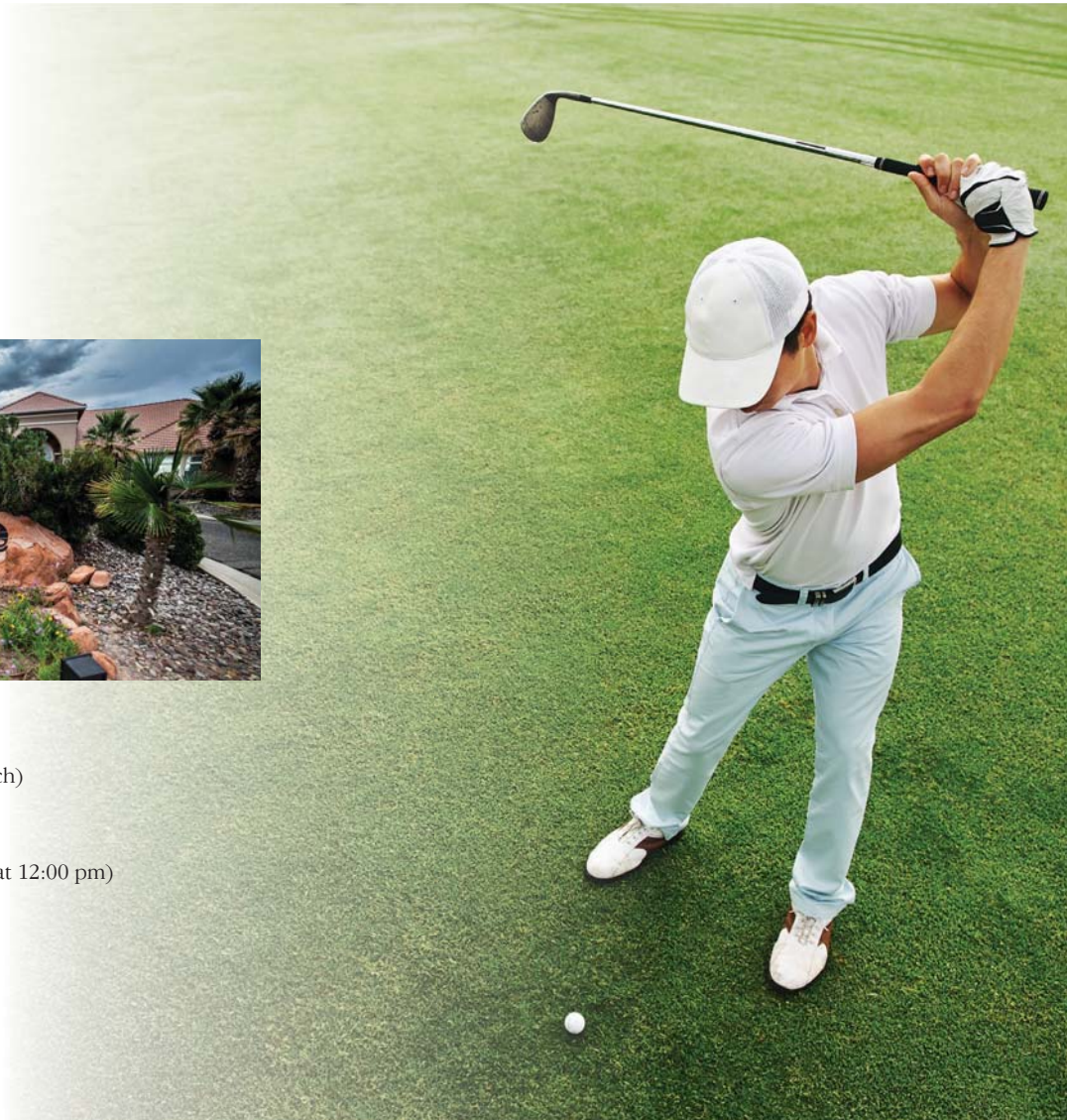
\$50.00 per person (includes cart and lunch)

LUNCH

Box lunches & drink provided (available at 12:00 pm)

CONTACT

Jeff Beckman
Bowen, Collins & Associates
154 East 14000 South
Draper, UT 84020
801.495.2224
jbeckman@bowencollins.com



REGISTRATION FORMS AND FEES ARE DUE BY APRIL 7TH, 2017.

Register online at www.weau.org or by returning this registration form to Jeff Beckman (see above) along with a check payable to WEAU Golf Tournament.

Contact Jeff Beckman at (801) 495-2224 for team preference, or we will match single players to fill foursomes.

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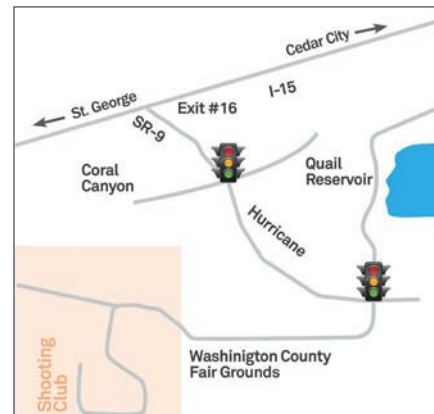
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Pretreatment Report

By Brett Nelson

Well I don't know about you all but I am so ready for spring!

No more water just sunshine. By the time this issue gets out we will have had our Guidance Manual training from the state. I hope we all got a lot of valuable information from that. And thanks to Jen and Matt for all their efforts and knowledge.

Another reminder: **The Region 8 Pretreatment Association annual conference is approaching fast. Registration is open!!**

The hotel is only going to hold the block of rooms set aside for the conference until April 9. If you have not made your reservations by then, **you will not receive the conference rate** and you may not be able to get a room in the conference hotel. We did set aside extra rooms this year but as they say "First come, first serve."

If you are attending the conference this year please complete the registration form, located at www.r8pa.com, and contact Adam Butterfield at adamb@susewer.com or (801) 455-2919 to get registered.

In order for the Board to have the conference badges and certificates printed in preparation for the conference, as well as the proper amount of food/beverages ordered, we would ask that everyone be

registered (or make arrangements with Adam) by April 7, 2016.

Also this was one of our somewhat anticipated announcements from our ongoing Mercury and Dental.

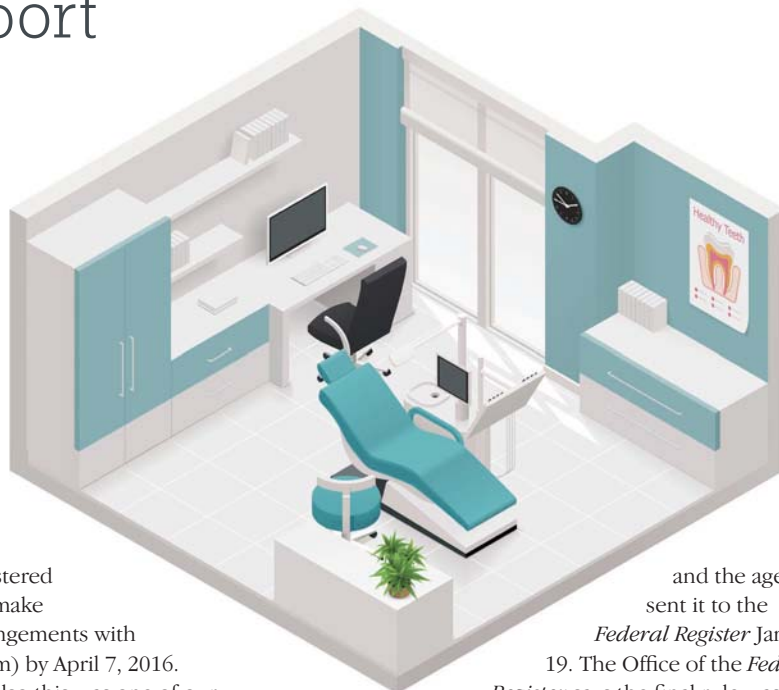
EPA's final rule setting *Clean Water Act (CWA)* pretreatment requirements for dental offices – known as the dental amalgam rule is under Trump administration's regulatory freeze to allow additional executive review.

Former EPA Administrator Gina McCarthy signed the final rule December 15,

and the agency sent it to the *Federal Register* January 19. The Office of the *Federal Register* says the final rule was

scheduled to be published in the January 24 *Federal Register*; but EPA asked for the rule to be withdrawn from publication.

The withdrawal request follows a January 20 memorandum from White House Chief of Staff Reince Priebus to the heads of EPA and other agencies to "immediately withdraw" any regulations that had been sent to the *Federal Register* but not yet published. **DTI**



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Spring 2017 Quiz

1. **Which of the following discharges would, in general require the lowest chlorine dosage for adequate disinfection?**
 - a. Primary effluent
 - b. Activated sludge plant effluent
 - c. Trickling filter effluent
 - d. Sand filter effluent

2. **What is the best method to prevent short circuiting in a clarifier?**
 - a. Temperature control
 - b. Runner plates on the bottom of the clarifier
 - c. Increase Detention time
 - d. Use of properly designed baffles

3. **Lab results indicate that 12 ml of 4% NaOH will increase the PH of 1 L wastewater to 12 and precipitate copper. How many gallons of 4% NaOH are needed to treat 500 gallons of wastewater?**
 - a. 4 gal
 - b. 6 gal
 - c. 12 gal
 - d. 50 gal

4. **Proportional weirs usually located at...**
 - a. Magnetic flow meters
 - b. Stilling wells
 - c. Aerobic digester scum boxes
 - d. Grit chambers

5. **A particular electric motor is wound for 3 phase current. If the motor is fully loaded and one phase cuts out while in its operation...**
 - a. The motor will continue to run without danger, but will operate 1/3 less power
 - b. The motor will stop immediately
 - c. The motor will become hot and damaged unless protected by a thermal device
 - d. The motor will continue to run without damage

6. **What is the maximum safe level of ammonia a worker can be exposed to during an 8 hour day?**
 - a. .5 ppm
 - b. 1000 ppm
 - c. 1.0 ppm
 - d. 50 ppm

7. **Which of the following is not a form of polymer used in wastewater treatment?**
 - a. Mannich
 - b. Condensed Vapor
 - c. Dry powder
 - d. Emulsion

8. **A valve that only allows water to flow in one direction is a _____ valve.**
 - a. Check
 - b. Gate
 - c. Butterfly
 - d. Globe

9. **Most extended aeration basins have _____.**
 - a. Large aerators
 - b. Long solids retention times
 - c. Several primary clarifiers
 - d. Very long basins

10. **A PH of 6.2 is considered _____.**
 - a. Acidic
 - b. Basic
 - c. Neutral
 - d. Impossible to reach

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ANSWERS:

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

Baby Boomers Leaving the Workforce

By Jared O'Brien



I think it's safe to say that most of us have heard of the baby boomer generation. This is a generation that was born post World War II from approximately the years of 1946-1964. In 1964 when the baby boom had started to decline, the population consisted of approximately 76 million "baby boomers" which was about forty percent of the population at that time. In 2017 that puts this generation between the ages of 53-71. Let's just say hypothetically that the optimum age for retirement is 65, which mean the boomer generation has been entering retirement for at least six years now.

What does all this mean? It means that over the next 12 to 15 years a good portion of our workforce will be entering retirement. The succeeding generation "generation X" was born approximately from the late sixties to early eighties. This much smaller generation was estimated at about 55 million people. A difference of more than twenty million people, from generation to generation.

Over the next 15 years we will be going through a rapid transition of "baby boomers" leaving the workforce. The succeeding generations primarily the "generation X" and secondly the "millennial" generation; will need to fulfill some of these workforce vacancies. Many of which will be management type positions in the workforce. All though this will leave some growth for the succeeding generations, these "baby boomers" will be taking a considerable amount of knowledge and/or experience with them. I believe that it is up to us from the "generation X" and the "Millennials," that over this next decade or so we must obtain as much information and knowledge as we possibly can from the "baby boomer" generation. I believe that the amount of information we retain from their years of experience will be partial in aiding our future success. [Dn](#)

Fact Credentials include: Wikipedia, www.history.com, and Pew Research Center.

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3. What is the maximum length of time you should go between Tetanus vaccinations?
4. Name 2 items that OSHA requires employers provide?
5. Where is an appropriate place to store work items?
6. How long can Hepatitis B survive outside of the body?
7. Can Tetanus kill you?
8. Hand washing should be done to prevent?
9. Has live HIV ever been found in a sample of raw sewage?
10. Should you store your work clothes with your personal clothes?

ANSWERS:

1. Bloodborne Pathogens
2. No
3. 10 years
4. Training and Protective Equipment
5. Away from non-work areas
6. 7 Days
7. Yes
8. Cross Contamination
9. No
10. No

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Safety Committees

By Curt Simmons, WEAU Safety Committee



There are many reasons for the success or failure of safety in our industry. Finding an approach that works for your facility is not always the same that works for ours. As I began thinking of a good topic for this issue of the Digested News I asked myself, “What is the one single thing that makes employees feel more a part of our safety program?” My answer is - a successful, functioning Safety Committee in which the employees are involved. Even in the early years of our safety program the safety committee played a key role in finding hazards, identifying root causes, and deciding what actions to take to alleviate these problem areas.

Safety Committees can be a great tool for measuring the success of any safety program. If your employees are excited to participate, bring to your attention safety hazards, and openly discuss issues amongst fellow employees or managers, there is a good chance that your safety program will be a great success.

There are many ways to conduct these meetings, but at a minimum, your committee should consist of a representative from each department, i.e. management, maintenance, collections, lab, operations, etc. Choose a leader from your members that can run an agenda, but make sure he/she does not dictate how the discussions go or allow other members of the committee to do so. Before starting, be sure to lay


out ground rules that the committee must follow. This keeps your committee flowing in the correct direction without the additional burden of blaming, or singling out any person or department. The leader must maintain an orderly flow in the meeting and not allow the group to give unfair and unwarranted focus on single items. Try to assure that every member participates in the discussion. Foster the idea that makes every member of your committee feels like they have a voice in the operation of safety in their respective areas. Not every committee will function the same way... again we must all find what works for our own facilities. Over the years, I have found some things that have worked for our facility and I would like to share them with you.

Key guidelines to follow for a productive Safety Committee:

- First and foremost, for any successful Safety Committee it must have strong upper management support.
- Keep order, have a written agenda, and try to follow it.
- Include everyone in all discussions. You will be surprised how valuable one department’s take on another department’s hazard can be.
- Never allow discussions to become personal.
- Avoid blaming. Focus on overall causes of accidents, hazards, etc. not employees or departments.

- Keep your meetings short, a short meeting will keep all members interested in your discussions, topics, etc... Don’t beat things to death!
- If you have a member of upper management as one of your committee members, make sure that your committee is not intimidated by him/her.
- Follow up on items discussed. If the items discussed by your committee members are never acted upon, they will feel like they are wasting their time. Document everything and create task lists to be sure nothing is overlooked.

There are many facets to a successful Safety Committee, many more than can be discussed in a short commentary from my point of view. There are countless articles on the internet, OSHA web sites, Utah Safety Council, etc. A quick Google search will give you lots of great information to help, or even how to start, if you do not already have a committee.

Forming a functioning Safety Committee is key to a great safety program. If you have a safety committee, study it. Make certain that it functions well, is efficient, and, most important, make sure every member is participating. If you don’t hold regular Safety Committee meetings, start them! You will be surprised how much information your employees can share with you. Employees are the greatest asset in any facility... Listen to them! 

Toolbox Safety Talk: Be Successful




When we think of lockout/tagout (LOTO) often control of electrical energy comes to mind. Though it is vital to LOTO equipment to protect ourselves from electrical shock or a machine starting up while part of our body is in harm's way, this is only part of the hazards we must protect ourselves from.

Failure to control hazardous energy accounts for nearly 10 percent of the

serious accidents in many industries. We must always be aware of other potential hazards such as stored energy, i.e. hot water, steam, wastewater under pressure, hydraulic pressure, etc.

Proper LOTO practices and procedures safeguard workers from hazardous energy releases but it may not be enough to just place a lock on a valve, switch, or breaker. Often we must

drain systems, release pressure, lower hydraulics rams, etc. before we begin working. Sometimes the hazards are well hidden and you don't find them until it is too late. It takes serious observation to identify hazards that lurk in the tasks we are asked to do. Just a few more minutes of assessment may save you from a life of pain, loss of a limb, or even death. 

Spotlight on Gordon Call

By Rob Jaterka

Gordon Call was born and raised in Ogden, Utah. Graduated from Bonneville High where he played football, basketball, and baseball. After high school Gordon completed two years at at Weber State University. To this day he still enjoys watching and playing multiple sports. For those of you who don't know Gordon, he may be a little competitive. Somehow his

“ Having competed in the Operators Challenge since 2005 he has been to nationals seven times.

lovely wife Nicole has been able to put up with him for the last 25 years (congrats you guys). The father of three girls and one boy, Gordon spends his free time at the skate park with his two youngest. North Davis Sewer District took a Chance on him in 2005. Since then he has worked his way up to become the operations lead. Also operator of the year over 5mgd. Having competed in the Operators Challenge since 2005 he has been to nationals seven times. [DN](#)



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Algae: From Resource Depletion to Resource Recovery

Introduction

Generally, when we think of algae in water quality context, we think of how nutrients in agricultural runoff, municipal wastewater effluent, and urban stormwater provide the conditions for algae blooms in water bodies. These algal blooms lead to eutrophication and dead zones, causing water quality and negative economic effects.

The same biological processes that lead to water quality problems from nutrient pollution can be harnessed to treat, and recover, nitrogen and phosphorus through production of algae biomass for wastewater bioremediation. Algae can be cultivated and harvested to create biomass that can be transformed into biofuels and bioproducts.

As the wastewater sector seeks to manage high energy costs while recovering resources to meet tighter nutrient limits, the algae bioproducts and biofuels industry is searching for productive feedstock. The potential is being recognized, as demonstrated by awarding of the 2016 Paul L. Busch Award to Jeremy S. Guest, assistant professor in the Department of Civil & Environmental Engineering at the University of Illinois at Urbana-Champaign. This \$100,000 award recognizes Guest's work with algae treatment and resource recovery.

In October 2016, the Water Environment Federation (WEF; Alexandria, Va.) and the Algae Biomass Organization (ABO; Preston, Minn.) hosted the forum Algae in Wastewater Treatment at the Algae Biomass Summit. The forum brought together algae technology developers, leading design and engineering firms, municipalities, regulators, and other stakeholders to review the state of algae-based tertiary wastewater treatment systems. Forum participants also discussed opportunities and challenges in deploying such systems in the context of an evolving economic, environmental and regulatory landscape.

Types of Algae

Algae tolerate a wide range in environments with respect to temperature, salinity, and water quality. The communities of algae found in treatment and harvesting operations typically are mixed culture, combining both photosynthetic and heterotrophic types, as occurs in nature. Photosynthetic algae use nutrients from nitrogen and phosphorus in wastewater, capture carbon as carbon dioxide, use energy from sunlight, and produce oxygen as a waste product. Heterotrophic algae use organic chemicals for carbon and energy.

Blue-green algae are photosynthetic, but actually are bacteria (cyanobacteria) that contain phyocyanin, which give the blue-green color. Blue-green algae also produce microcystins, which are toxins that cause many of the negative effects of algae blooms in lakes. Other algae are eukaryotes, as opposed to bacteria, and are generally green, brown, and red. Common green algae strains are shown in Figure 1.

Algae Treatment

The use of algae as wastewater treatment is common, as the biological processes take place in ponds and lagoons naturally. About half of the 16,000 regulated water resource recovery facilities (WRRFs) have ponds/lagoons. These features are prevalent especially at smaller WRRFs (Bastian 2016). The efforts now are focusing on how to use microalgae for wastewater treatment within conventional WRRFs.

Similar to other biological wastewater treatment techniques, algae treatment can utilize suspended- or attached-grown methods. Suspended-growth ponds use paddles keep microalgae suspended for sunlight, coupled with a shallow depth for light penetration. The layout of these ponds gives rise to the name raceways, as shown in Figure 2.



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Attached growth techniques utilize a substratum that rotates alternatively through wastewater (to provide nutrients) and atmosphere (to provide sunlight and carbon dioxide). Two common types of attached growth algae treatment technologies are biofilm rotating algae biofilm reactor (RABR) and revolving algal biofilm (RAB).

In pilot tests in Chicago, an RAB system has demonstrated the potential for recovering nutrients from wastewater. The RAB system is capable of producing concentrated algae biomass (10% to 25% solids), which has value and can be used to produce a variety of products (Kumar 2016).

Several types of wastewater are applicable for algae treatment including municipal wastewater, produced water from oil and gas extraction, dairy farms and swine wastewater. During treatment, nitrates and phosphates are combined with water and carbon dioxide to grow the algae. Microalgae often is represented by the chemical formula $C_{106}H_{263}O_{110}N_{16}P_1$. It is important to note the phosphorus to nitrogen ratio of 1 to 16 when evaluating the design, as well as looking to add carbon dioxide to balance the carbon:nitrogen:phosphorus ratio and achieve completed nutrient assimilation, according to Ron Sims, who gave the presentation Microalgae-based approaches to Algae-based tertiary wastewater treatment at the forum.

Most of our existing laws and regulations that deal with wastewater were designed with conventional treatment systems in mind. How does algae fit in the regulatory environment? 40 CFR Part 503 includes definitions for Class A and Class B biosolids. Algae from municipal wastewater (as part of the treatment system) are subject to Part 503. Algae solids from municipal treatment could meet class A or Class A/EQ in a number of ways. Metals are unlikely to be problematic and consistent low metals and pathogens may provide basis for reduced monitoring, said Robert Bastian in his presentation, Algae Biotechnology for Wastewater Treatment: Regulatory Issues, at the forum.

Bioproducts and Bioenergy

A number of bioproducts can be produced from algae biomass. Fertilizers from algae solids generally have about 8% to 10% nitrogen content and 1% to 2% phosphorus content, Bastian said. The biomass also can be used as feed for aquaculture and agriculture. Products from phycocyanin include pigments and antioxidants, Sims also reported.

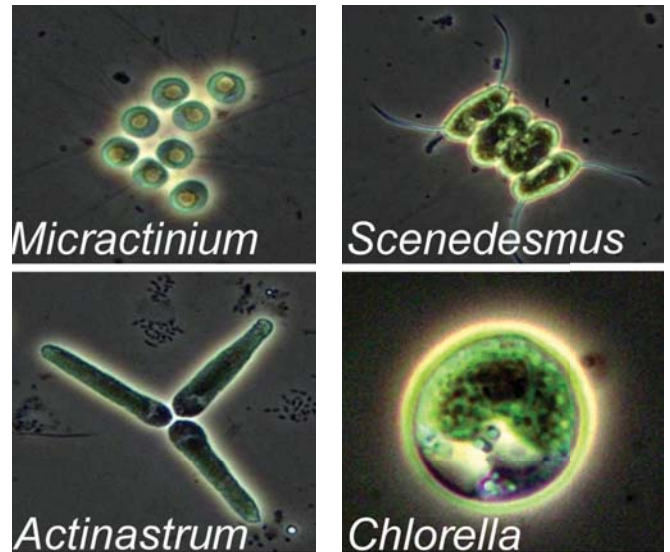


Figure 1. Green algae typically found in wastewater pond polycultures. Credit: Lundquist, T., Spierling, R., Parker, L., Pittner, C., Medina, L., Steffen, T., Alvarez, J., Adler, N., and Benemann, J. (2016). "The RNEW® Process: Recycled Water, Fertilizer, and Power from Wastewater," presented at Algae Biomass Summit, Oct. 23, 2016, Phoenix, Ariz.



Figure 2. Raceway Algae high rate pond. Credit: Lundquist, T., Spierling, R., Parker, L., Pittner, C., Medina, L., Steffen, T., Alvarez, J., Adler, N., and Benemann, J. (2016). "The RNEW® Process: Recycled Water, Fertilizer, and Power from Wastewater," presented at Algae Biomass Summit, Oct. 23, 2016, Phoenix, Ariz.

The first techno-economic analysis (TEA) for algae biofuels integrated with wastewater treatment was performed in 1960, according to Algae Biotechnology for Wastewater Treatment: An Introduction presented by John Benneman. Using anaerobic digestion, the biomass can produce biogas, especially when mixed with food wastes and municipal wastewater biosolids to generate more methane for combined heat and power (CHP). Additional processing, such as hydrothermal liquefaction (“pressure cooking”) can convert algae to biocrude oil. Other processes can produce biodiesel, bioplastics, acetone, butanol, and ethanol, Sims said.

When evaluating any energy resource recovery opportunity, it is important to calculate the energy return on investment (EROI): Does the system provide more usable energy than it consumes?


According to recent work in Europe, algae biofuels have an EROI of 1.9, substantially higher than corn ethanol’s and biodiesel’s value of 1.3. In addition, biomethane from algae enables greenhouse gas savings of more than 50% compared to diesel. Furthermore, algae biofuel production per hectare is 10,000 kg CH₄/ha/yr, enough to fuel 10 vehicles, double sugar bioethanol and palm oil diesel, reported Frank Rogalla in his presentation, Wastewater Treatment and Energy Recovery with Cultivation of Microalgae.

Conclusions

State regulators, municipalities, and other industrialized jurisdictions increasingly are moving toward tertiary wastewater treatment as a means to mitigate the environmental effects of nitrogen, phosphorus, heavy metals, and other components of traditional wastewater treatment systems. But traditional systems can be an expensive and energy intensive proposition.

Algae-based systems, which make up just a small fraction of tertiary systems in use today, offer a potential solution, providing a low input-energy platform for nutrient recovery with a variety of opportunities for production of value-added coproducts.

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Barry Liner is director of the Water Science & Engineering Center at WEF. **Noah Mundt**, senior program manager at Siemens, was a moderator of the forum and is a member of both WEF and ABO (www.algaebiomass.org).

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Public Communication and Outreach Program Awards

Individual Category

Kenneth W. Burgener

Laboratory Director

North Davis Sewer District, Syracuse, Utah

Biographical Information

Ken graduated from Brigham Young University with a Bachelor's degree in Horticulture and a Master's degree in Agronomy.

He has worked for 21 years as the Laboratory Director of the North Davis Sewer District. He has served as Chairman and as a member of the Water Environment Association of Utah (WEAU) Laboratory committee and has served on other WEAU committees. Ken was inducted into the 5S for his service to WEAU. He has been awarded the WEF Laboratory Analyst Excellence Award in 2001. While under his supervision, the North Davis Laboratory has been awarded Outstanding Laboratory six times by WEAU. Ken is well known and respected throughout the State of Utah as a knowledgeable, experienced, and competent Laboratory Director.

Ken has been married for 36 years to his sweetheart, Margene. They have 4 children and 12 grandchildren. His main interests, outside of his family, are chemistry, microbiology, soil science, laboratory equipment, plants, composting, aquaponics, and gardening. He is a true "Science Geek" and proud of it.

Public Communication and Outreach Efforts

- Ken has for many years been involved in science fairs at several of the local elementary, Jr. High, and High Schools, both as a judge and as an advisor. The faculty and organizers of the



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“ He has worked with the top students in science as a mentor and advisor. These students have utilized the North Davis Sewer District Laboratory and other facilities to perform their projects. Many of those students under his guidance and encouragement have won top honors not only in the local High School competitions, but in the State, and in the National Competitions. Many of them have been awarded prestigious scholarships totaling in the hundreds of thousands of dollars.

Science Fairs all over the State of Utah know Ken very well and greatly appreciate his involvement and expertise.

- Ken has been instrumental in developing and administering WEAU’s annual donation to the Science and STEM Fairs of the State of Utah. WEAU donates \$1,000 annually which is divided between the winners of seven major junior high school and seven major high school science fairs in topics related to water.
- Ken participates in STEM™ job fairs with a booth to encourage young students to pursue careers in science and answer any questions that they have regarding a science-based career.
- Ken is well known among the science faculty members in Davis and Weber Counties for the resource he has become to students who aspire to perform well in local and national science fair competitions. He has worked with the top students in science as a mentor and advisor. These students have utilized the North Davis Sewer District Laboratory and other facilities to perform their projects. Many of those students under his guidance and encouragement have won top honors not only in the local High School competitions, but in the State, and in the National Competitions. Many of them have been awarded prestigious scholarships totaling in the hundreds of thousands of dollars.
- Ken has set up demonstration projects on the North Davis Sewer District plant site including aquariums and aquaponics demonstrations to use as a visual and teaching aid to help him encourage and demonstrate to science students the exciting field of science and water research.
- He has set up special displays and posters in the District’s training room to help those who take tours to better understand the principles of microbiology and wastewater treatment. Ken was instrumental in designing and setting up the District’s Laboratory Training Room which was part of the 2008 laboratory expansion project which is not only used for District training activities but is the introductory point for facilities tours.
- Ken has kept one student’s science fair research instruments set up in the laboratory training room for several years to use as an



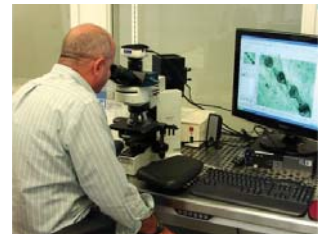
Ken teaching students about the importance of clean water in the world.



Ken with Whitney Heilesen and her Science Fair project "How Does the Biotower Treatment Affect eColi Levels in Wastewater." She qualified for the international Intel® ISEF competition.



Ken with Josh Christensen and his Science Fair project about Fuel Cells.



Ken using microscope to view interesting microorganisms found in wastewater to show tour groups.

example to school students who come to the laboratory for a tour on what interesting possibilities there are in science.

- Ken and the District promote the availability of the District’s laboratory and treatment plant facilities for tours and educational opportunities. The facility is one of three major facilities used by Davis School District for science and technology tours. Three years ago over 4,000 school students toured the laboratory and plant site.
- Ken has been the WEAU Public Education Committee Chairman for many years and has administered the Stockholm Junior Water Prize competition on behalf of the WEAU. [DN](#)

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Mr. Blaine E. Boyer
1235 So. Hoytsville Rd.
Coalville, Utah 84017

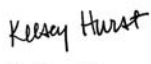
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The Water Environment Federation congratulates you on this achievement and thanks you for your dedicated service to both the profession and WEF!

Sincerely,



Kelsey (Brown) Hurst
Manager,
Association Engagement & Awards
khurst@wef.org
703-684-2477

cc: Daniel Griffin, Awards Chair, WEA of Utah
Clint Rogers, President-Elect, WEA of Utah

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February 10, 2017

Mr. Brent Justensen
Operations Manager
2200 South Sunset Dr.
Kaysville, Utah 84037


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February 10, 2017

Mr. Gary A. Hill
289 West 300 South
Mt. Pleasant, UT 84847

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Your QCOC recognition award and pin will be presented at your MA's annual meeting.

The Water Environment Federation congratulates you on this achievement and thanks you for your dedicated service to both the profession and WEF!

Sincerely,



Kelsey (Brown) Hurst
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USU student engineers runner up at WEFTEC

A team of USU student engineers were awarded Runner Up at the WEF Student Design Competition at WEFTEC 2016 for their design of the Central Davis biosolids facility. The proposed design included a new technology called Biochar which efficiently reduces the volume of the biosolids, eliminates foul odors, and has a net zero energy footprint. The USU team also won the WEAU state competition last spring.

The 2016 team was composed of Ahmad Bitar (Graduate Student, CEE), Erin Andersen (Graduate Student, CEE), Dominique Bertrand (Junior, CEE), Darren Bingham (Senior, NR), and Dan Horne (Junior, CEE) and is mentored by Dr. Ryan

DuPont. “We had a tremendous show of support from the Dean of the College of Engineering, the CEE department, the College of Natural Resources, and WEAU” says

Dominique, the 2016 co-team leader. “We are also grateful for our academic advisors, and for our professional mentors.” [DN](#)



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