

FALL  
2016

The Official Publication of the Water Environment Association of Utah



# DIGESTED news

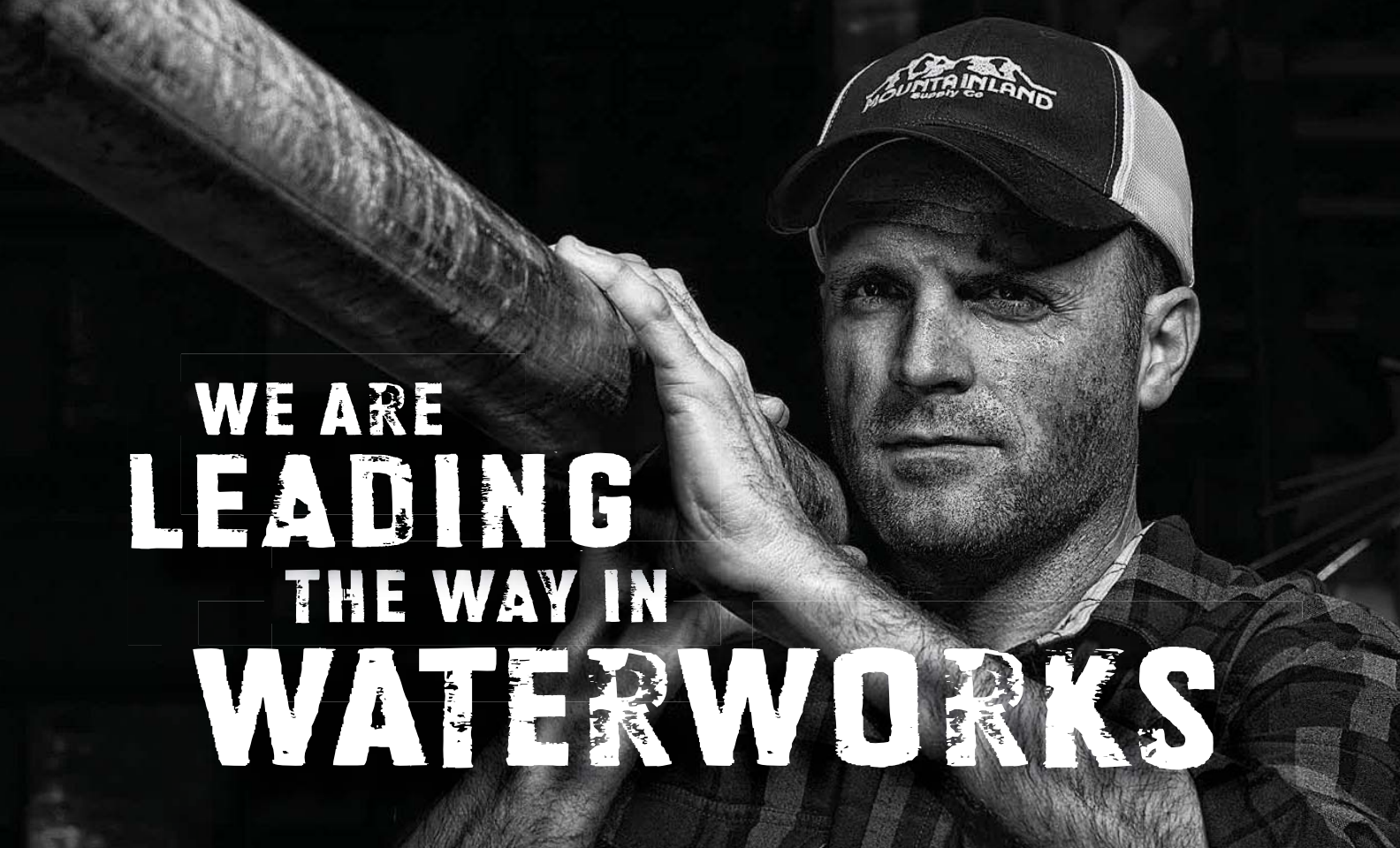
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**INSIDE:**

Mid-Year Conference Preview ■ Biosolids Committee Field Report ■ WEF News



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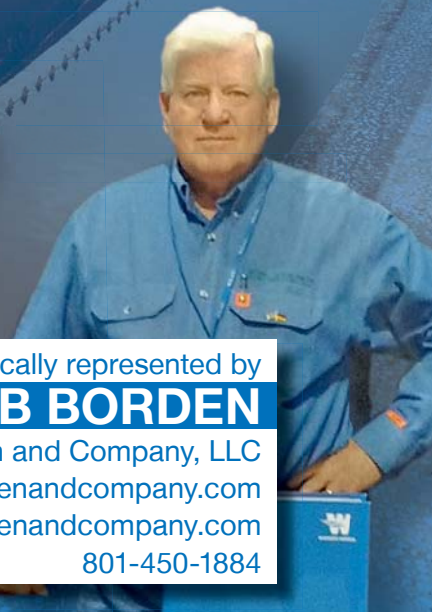
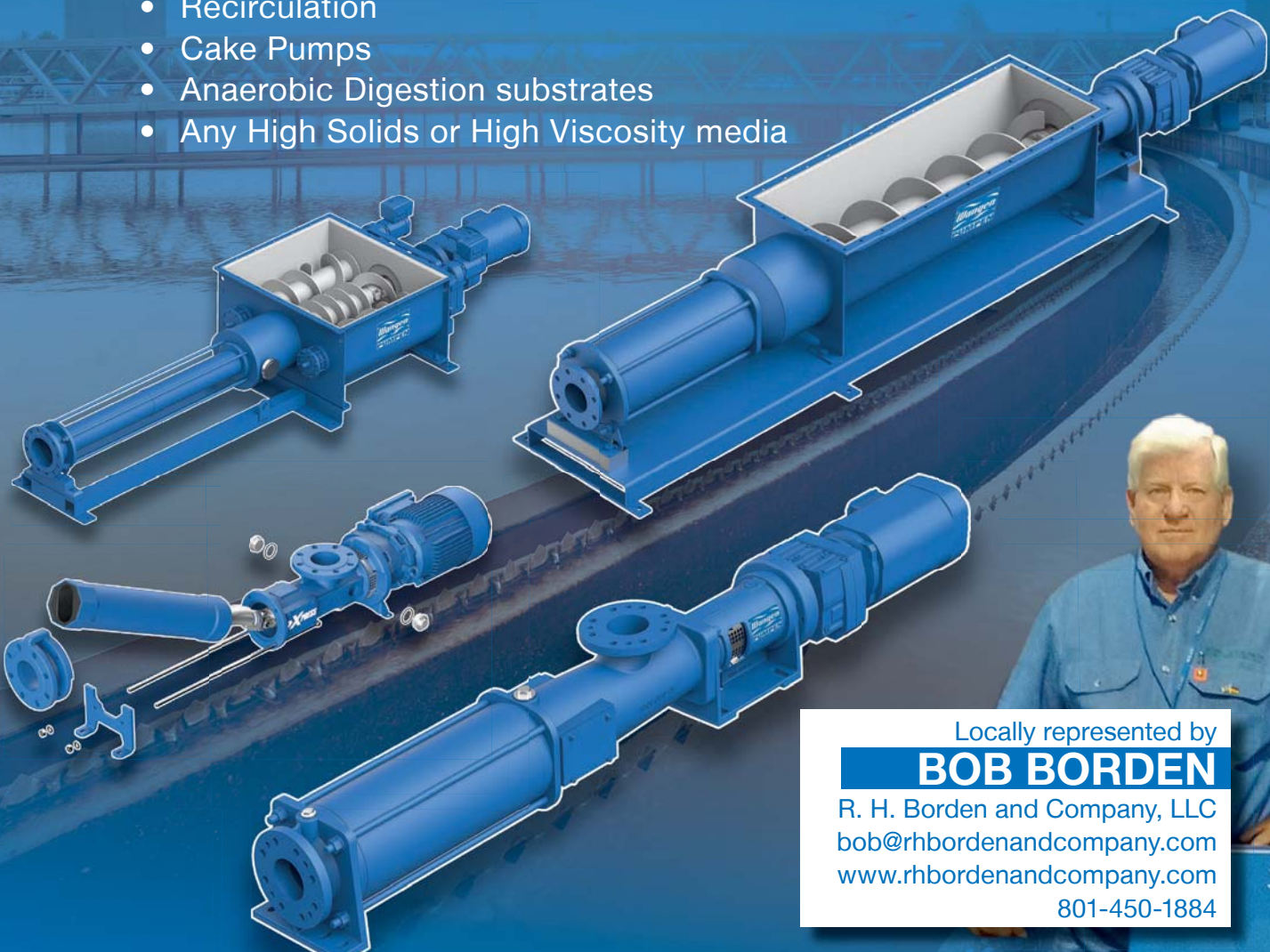


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Matt Myers

# Pushing to make things better

**I**t was a cold crisp autumn morning. The leaves had long since begun their effort to fall away from now barren tree limbs, but as always, a few persistent stragglers remained firmly gripping the branch that once supplied them with nutrients and water. Jane looked out the kitchen window at a few of these stragglers now, wondering if they would still be there when she got home, but then she realized almost simultaneously that today was no ordinary day, and she would likely forget all about checking in with those stubborn leaves when she got home.

Today was a special day. She had been anticipating this day for months. It couldn't arrive soon enough. Like a child awaiting Christmas morning, she had counted down the days until this this very day arrived, and now that it was here, everything seemed so surreal. Was she really going to be making the trek to the Cultural Celebration Center for the WEAU Midyear Conference? She could hardly believe it! The Midyear Meeting was chuck-full this year with mind-blowing presentations. How on Earth could somebody retain all that knowledge!!

“ Thanks to all of you who make things happen in our organization!

With that thought, Jane double-checked her bag to make sure her notebook was already there.

The food... oh the food! It was always a highlight to enjoy a buffet lunch, while listening to an interesting keynote speaker. She would make sure she sat by Sally, of course. She needed to ask Sally how their upgrade project was progressing, and find out if they had been able to solve some of their collections issues. The Midyear Conference was not only a great place to learn something new in the water quality arena, but also a great place to connect and network, Jane thought as she locked her door on her way to her car. Buckling her seatbelt she could hardly wait to get there.

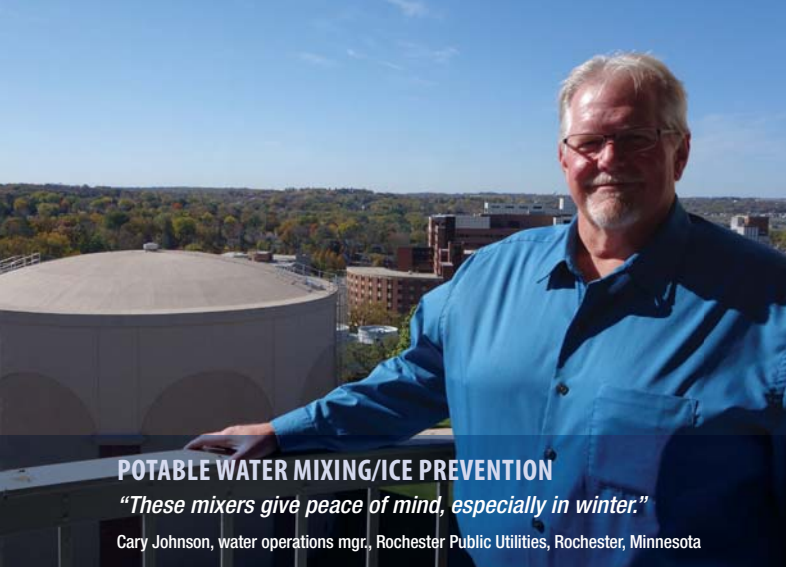
If you actually made it through the preceding three paragraphs and are still reading, hopefully you are cringing and

wondering why on earth Matt is wasting valuable Digested News real estate with this cheesy drivel?! The answer is very simple: I had no freaking idea what to write this quarter and was scraping barrel bottom for ideas! As cheesy as this effort was, hopefully it whet your appetite (a tiny bit maybe?) for the upcoming Midyear Conference, on Monday November 14. If it didn't, then we hope you come anyway, if only to kick me in the shin for wasting the past three minutes of your life! Either way I win because got you out to the Midyear!

Thanks to all of you who make things happen in our organization! Let's keep pushing to make the organization better and provide value where and how we individually can. [DNI](#)

**Matt Myers**  
President





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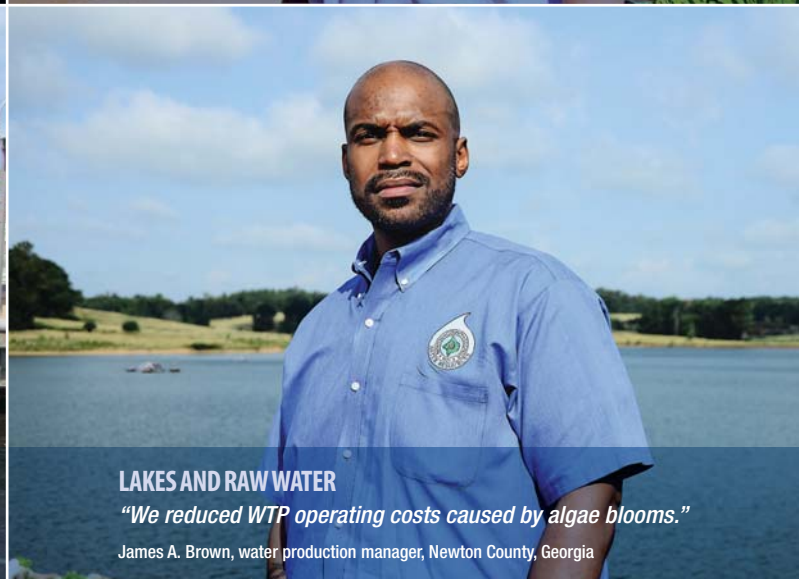
Tony Linder, WTP division chief, Dept. of Water Supply, County of Maui, Hawaii



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# Digested News a valuable asset

Chad Burrell

I wanted to take this opportunity to thank all of those whose effort goes into making this publication successful. I have been working as the editor for several years now and was very worried when I took it over that I could contribute much and continue to make it a valuable asset to our local industry here in Utah. My worries faded away as

I put my first issue together and as I have continued to work on it every quarter since then it has become much more enjoyable. Every quarter I receive articles, pictures, announcements, spotlights, and quizzes from various committees, organizations, and individuals. Kelman, our publisher, does a wonderful job ensuring that we have a wide

variety of companies that want to include advertising as well. We are always working on trying to improve the magazine and also ensure each issue gets out to as many members in the organization as possible. Please feel free to contact me if you ever have a question or concern or an idea to enhance the magazine even more. Thanks. **DB**



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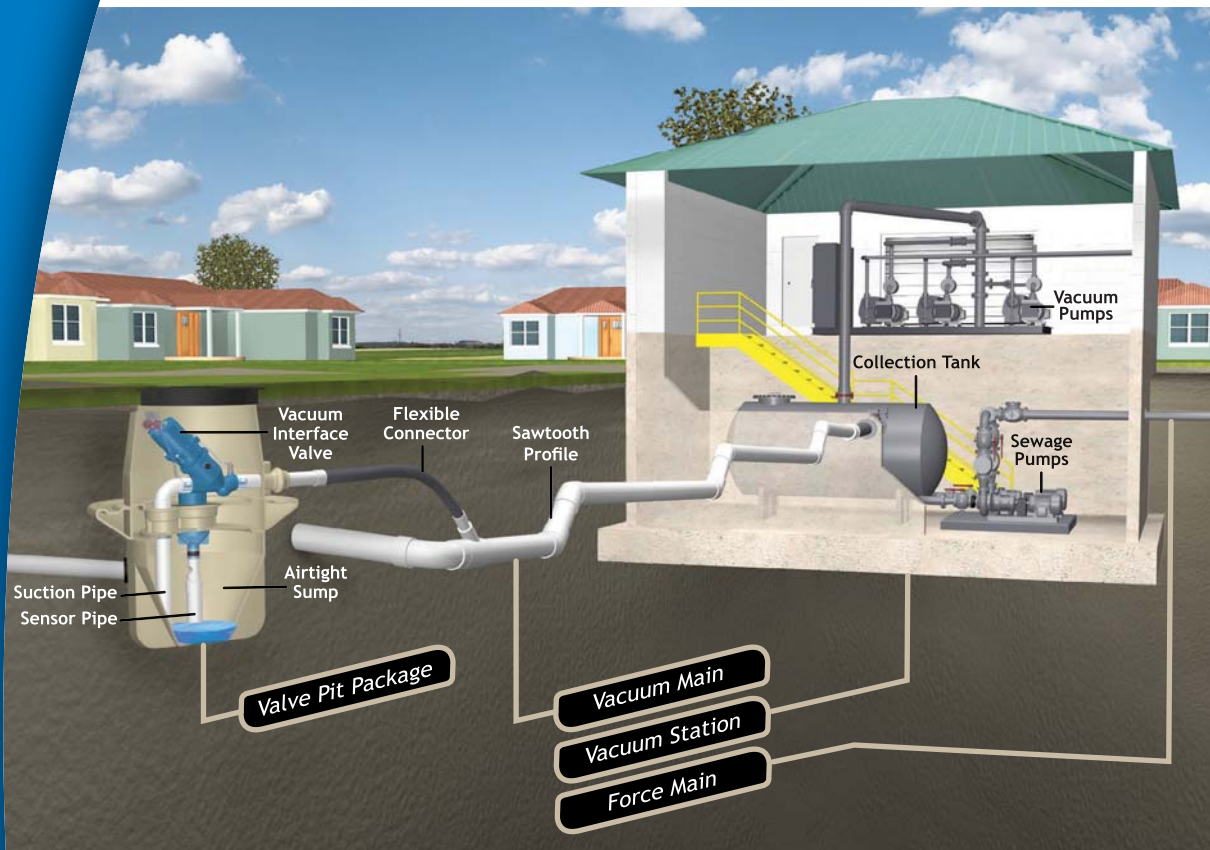
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# A Message from the PWO committee

by Jared O'Brien

**M**any of you may be aware of the Operations Challenge, but may not know exactly what it's about? I would like to spend a minute just to explain the insides of a couple new/changed events. So for 2016 the Safety event and the Process event have changed drastically.

Previously in the safety event the simulation of a coworker that has collapsed at the bottom of a manhole. A rescue team would assemble a safety retrieval gantry. This gantry would consist of a fall arrest device and a winch and pulley system with a seat attached to lower an entrant in to the manhole. This entrant would then harness up the victim and the victim gets extracted from the manhole. At the same time this is happening it also simulated that another coworker goes into cardiac arrest. One of the rescue team members uses an AED and CPR to resuscitate the victim.


The new safety event is similar in the fact that a coworker has collapsed at the bottom of a manhole. Instead of assembling a gantry a davit arm is used in its place, but only for extraction of the victim. Two team members harness up and are attached to two fifty-foot lifelines. An eight-foot manhole ladder is used to enter and exit the manhole. Both entrants enter the manhole one at a time, and the first thing they do is harness up the victim for extraction. Once the victim has been extracted they have a repair that needs to be made to a check valve. The two entrants isolate and lock out tag out the isolation valves. A supply bag containing tools and spare parts is lowered down the manhole to the entrants with a rope. After the repair is made the entrants now exit the manhole and all supplies are put away.

Now I would like to talk about the Process control event. This event as most people know of it as just a test. But this test consist of multiple choice, extended multiple choice, short math, and some process scenarios. This test is a timed test, the teams get a total of twenty minutes to complete the test. Previously all four team members would be working on the test at the same time. New for 2016 a computer simulator has been added to the event so now only two members will be taking the test and two working on a computer



simulator. The new process event was at this year's annual conference, and proved to be further challenge for the teams.

This summer the Wasatch All Stars and the North Davis Royal Flush teams have been working really hard at mastering these events as they will be competing at

WEFTEC. Not only are they learning two new events but still trying to master the new lab event which was changed for 2015. The two teams are doing well and should do well at WEFTEC! In the next issue we will have the results of how our teams do. GO UTAH! 



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# Operators Quiz

1. **Nitrification and Denitrification are two key processes involved in \_\_\_\_\_.**
  - a. Biological Nitrogen Removal
  - b. Clarification
  - c. Digestion
  - d. Sludge Dewatering
  
2. **Gas bubbles and floating sludge in a secondary clarifier is most likely a result of \_\_\_\_\_.**
  - a. High D.O. in the clarifiers influent
  - b. Excessive solids removed from the clarifier
  - c. Normal clarifier operation
  - d. Denitrification in the sludge blanket
  
3. **What is the efficiency of a lift station where the pump has an efficiency of 92% and the motor has an efficiency of 84%?**
  - a. 77%
  - b. 84%
  - c. 92%
  - d. 64%
  
4. **The fabric of a belt filter press has \_\_\_\_\_ to allow water to drain through.**
  - a. Serrated edges
  - b. An open weave
  - c. Small round holes
  - d. Open strips
  
5. **Given the following information, determine this wastewater treatment facility's BOD loading in lbs/day**  
**Influent Flow: 3 MGD**  
**Influent BOD: 220 mg/L**
  - a. 10945 lbs/day
  - b. 2520 lbs/day
  - c. 5504 lbs/day
  - d. 7298 lbs/day
  
6. **In an aeration tank, the color and appearance of the mixed liquor should be \_\_\_\_\_?**
  - a. Green
  - b. Grey
  - c. Brown
  - d. Dark Grey or Black
  
7. **The separation of solids from wastewater by gravity is known as \_\_\_\_\_?**
  - a. Disinfection
  - b. Aeration
  - c. Sedimentaion
  - d. Coagulation
  
8. **Before working on systems with pressurized air, for safety you should \_\_\_\_\_?**
  - a. Install carbon filters to eliminate odors
  - b. Isolate and depressurize the system
  - c. Use low pressure bottled gas to purge
  - d. Identify and mark all leaks
  
9. **Which type of bacteria obtain their oxygen by breaking down compounds containing oxygen?**
  - a. Anaerobic
  - b. Nitrifying
  - c. Fungi
  - d. Aerobic
  
10. **Trickling filters and RBC's are used to \_\_\_\_\_?**
  - a. Remove nitrates and chloride
  - b. Reduce BOD, TSS, and Amonia
  - c. Remove large objects and debris
  - d. Filter dissolved solids

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



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# Safety Quiz

- |  |  |   |
|--|--|---|
| <ol style="list-style-type: none"> <li>1. What is the name or the initials of the International System of chemical identification?</li> <li>2. Where can employees go to learn about the chemicals they work with?</li> <li>3. What hazardous chemicals are used at your workplace?</li> </ol> | <ol style="list-style-type: none"> <li>4. Are you authorized to use the chemicals?</li> <li>5. What are some of the effects hazardous chemicals can have on the body?</li> <li>6. List 5 of the 16 classes of physical hazards?</li> <li>7. List 4 of the 10 classes of Health Hazards.</li> </ol> | <ol style="list-style-type: none"> <li>8. Container labels and pictograms will tell you what about a chemical or mixture?</li> <li>9. What sort of safety equipment might one need when working with a hazardous chemical?</li> <li>10. List 3 of the 5 elements of on a chemical label?</li> </ol> |
|--|--|---|

## ANSWERS

- |  |  |   |
|--|--|---|
| <ol style="list-style-type: none"> <li>10. Pictogram, Signal word, Hazard respiratory protection et Statement, Precautionary Statement and First aid.</li> <li>9. Boots, gloves, safety glasses, goggles, face shield, apron, chemical or mixture.</li> <li>8. What are the hazards of the repeated exposure: Toxicology, Specific target Organ toxicology from a single dose or repeated exposure.</li> </ol> | <ol style="list-style-type: none"> <li>7. Acute toxicity, Skin Corrosion and Irritation, Eye damage or irritation, Respiratory or skin sensitization, Germ cell Mutagenicity, Reproductive Carcinogenicity.</li> <li>7. Acute toxicity, Skin Corrosion and Irritation, Eye damage or irritation, Gases when contacting water, and mixtures emitting flammable substances and liquids. Substances Gases under pressure, Self-heating Substances corrosive to metals, reactive substances or mixtures, solids, Organic peroxides, Self-heating liquids or solids, Pyrophoric liquids or</li> </ol> | <ol style="list-style-type: none"> <li>1. Global Harmonized System (GHS)</li> <li>2. Hazard Communication Program/Safety Data Sheets (SDS)</li> <li>3. Your list</li> <li>4. Are you Yes or No</li> <li>5. Death, Skin and or Eye Irritation or Burns and Inhalation problems</li> <li>6. Explosive, Flammable gasses, liquids or solids, Aerosols, Oxidizing gasses, liquids or</li> </ol> |
|--|--|---|



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# Effluent limit guidelines review with EPA

By Jeffery Macfarlane

On July 11, 2016 Ahmar Siddiqui of National EPA, along with Dan-Tam Nguyen and Anna Dimling of Eastern Research Group (ERG), a contractor for EPA, came to Utah to investigate new and innovative treatment technologies for treating metal-bearing wastewaters. They visited the Industrial Wastewater Treatment Plant (IWTP) at Hill Air Force Base and also toured the landing gear facility, plating shop, and chemical milling operation. On July 12 they went to the Central Weber Sewer District and toured the Williams International facility in Ogden.

Industrial pretreatment personnel Brett Nelson and Travis Hipwell of

Central Weber, and Jeff Macfarlane of North Davis Sewer District got the opportunity to meet with Ahmar, Dan-Tam, and Anna to discuss their perspectives on the Metal Finishing pollutant limits found in 40 CFR part 433. The inclusion of polychlorinated biphenyls (PCBs) and pesticides as well as 2,3,7,8-TCDD, a dioxin commonly found in pulp and paper manufacturing, in the Total Toxic Organics list in metal finishing permits was discussed. The testing for these pollutant compounds can be fairly expensive especially for a “mom and pop” operation or a new business struggling to get started. The pretreatment personnel

expressed their concern that these pollutant compounds have nothing to do with electroplating or metal finishing and should not be included in that list.

The question was asked of Mr. Siddiqui and he said that these Effluent Limit Guidelines were established in the late 70s and early 80s when analytical methods were not as good, and there was less data from which to develop environmental policy. He said he would discuss the issue with others in his department when he got back to EPA headquarters.

I don't know if anything will come of the meeting or the discussion but it was nice to have the opportunity to share our views. 



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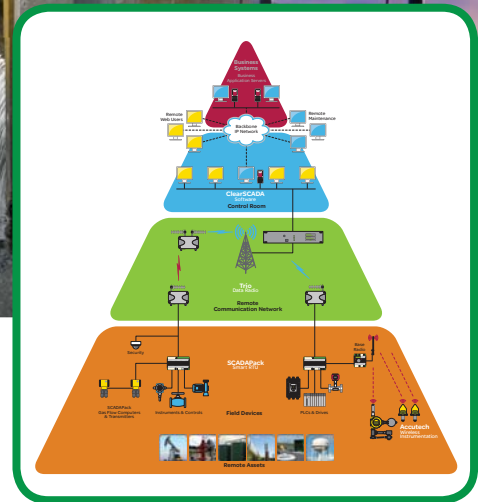
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# Safety – Risk and Hazard

By Kirk Freeman, WEAU Safety Committee

**A** hazard is a condition of potential harm, think of some common cartoon setups, such as a banana peel on the floor, a dog on a long chain, or a coyote chasing a roadrunner on a winding cliff road. Of course, the best choice would be to avoid or minimize any contact with known hazardous conditions or activities to keep from becoming a casualty.

The difficulty, of course, is to correctly interpret hazardous situations and take precautionary steps in an environment of constant change, escalating job requirements, and unforeseen risks. Risk is the condition of a human interacting with a hazard. The key to survival in a hazardous environment is to expand our imaginations and see more elements of hazard, effectively limit or control our interaction in that hazardous environment by using preventive tools, equipment, and procedures, and to consciously maintain a distance from hazardous operations, if possible. When contemplating the creation of a hazard, such as lifting a load overhead, workers and managers should deliberately and

constructively manage risk by barricading, warning, and controlling the severity of



the hazard. Conducting a team planning meeting is a tool to effectively identify hazards created in a work sequence, assure

proper operation of mechanical devices and personal protective equipment that will be used, and limit the risks of exposure to hazardous conditions.

Our strategy to control risk becomes a system of avoiding “piling up” hazards. What would happen, for example, if we were driving a little too fast AND the road was wet? What could happen if a tripping hazard were combined with poor lighting? Could an approaching storm affect our plans to use a ladder?

Our strategy should also involve using a “start over” approach to assessing hazardous situations. Because we’ve navigated a hazard successfully in the past, is no guarantee or indication that that hazard is lessened or any more manageable than when we first encountered it. Before we use a ladder, we should ask ourselves if there is a better approach, a scaffold or manlift, for instance. If we create a potential hazard by employing the use of a certain type of equipment, it is part of the job to mitigate that hazard. Finally, if we’ve successfully navigated a hazard, we should communicate and recommend any “lessons learned” to improve the safety process for fellow employees and the agency we work for. [Dn](#)

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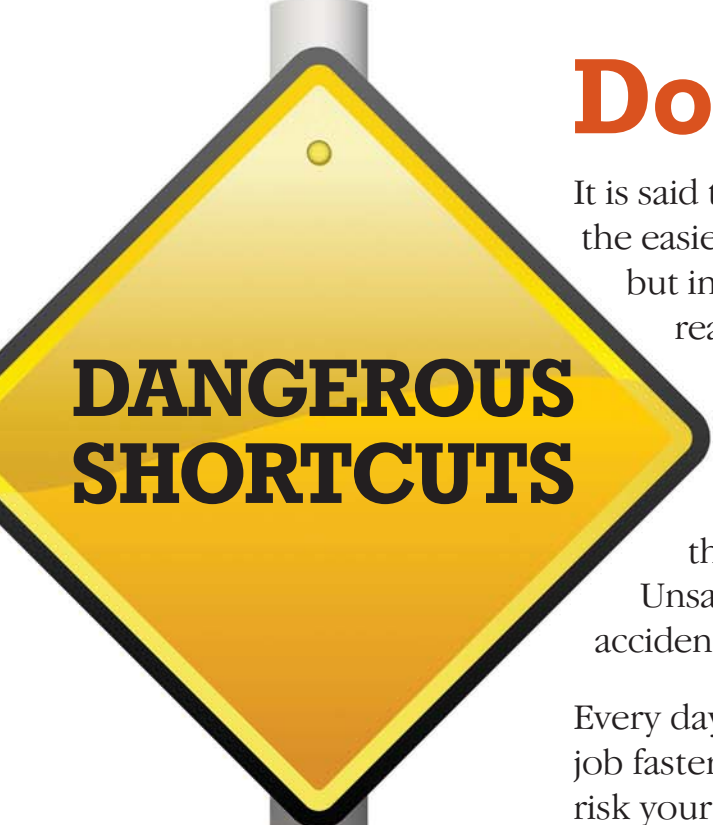
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# Toolbox Safety Talk

## Don't Be Lazy



It is said that humans are notoriously lazy, we try to find the easiest way to do almost anything. Not just at work but in our home lives as well. This is the primary reason that we take chances, we are too lazy to do what it takes the correct way... so we take shortcuts. Shortcuts are one of the number one causes of accidents in the US today. Consider this statistic: 80 out of every 100 accidents are the fault of the person involved in the incident. Unsafe Acts like shortcuts cause four times as many accidents & injuries as unsafe conditions.

Every day we make decisions we hope will make the job faster and more efficient. But do time savers ever risk your own safety, or that of other crew members? Shortcuts that reduce your safety on the job are not shortcuts, but an increased chance for injury.

The safe way is not always the shortest way. However choosing the safe way is your personal responsibility. Whenever you work on a project, you are expected to take the safe route - not some shorter or more dangerous one.

Your first responsibility is to yourself. Remember that safety rules and procedures have been put into place to save you trouble and to help prevent injury. If you see anyone taking shortcuts, warn them of the dangers involved and alert your supervisor. The life you save may be your own!

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**SERIES 39 CHECK VALVES**

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# 2016 WEAU

## PRELIMINARY MID-YEAR CONFERENCE TECHNICAL SESSION SCHEDULE

| CONFERENCE SCHEDULE |  |
|---------------------|--|
| TIME                | EVENT                                  |
| 8:00-8:30           | Registration and Continental Breakfast |
| 8:30-10:00          | <b>Morning Sessions</b>                |
| 10:00-10:20         | Break                                  |
| 10:20-11:50         | <b>Late Morning Sessions</b>           |
| 12:00-1:20          | Lunch and Keynote Speaker              |
| 1:30-3:00           | <b>Afternoon Sessions</b>              |
| 3:00-3:20           | Break                                  |
| 3:20-4:00           | <b>Late Afternoon Sessions</b>         |
| 4:00                | Return Lanyards and Prize Drawing      |

### PRELIMINARY TECHNICAL SESSION LISTING

| NUTRIENT REMOVAL  | WASTEWATER FACILITY PLANNING  | OPERATIONS   | COLLECTIONS   |
|---|---|--|---|
| <b>What Are Our Options for P Management in Full-Scale Wastewater Treatment Plant?</b><br>(Ramesh Goel - University of Utah)  | <b>Designing a New Screening Building: Application of the Envision Framework and SLC's Sustainability Policies</b><br>(Jenni Oman, Valerie Fuchs, Trevor Lindley, Giles Demke - SLCDPU) | <b>What is My ORP Telling Me?</b><br>(John Gallagher - South Valley Sewer District, JBWRF)                                 | <b>Collection System Flow Monitoring Using Area/Velocity Sensors</b><br>(Steve Combe - Frontier Precision)  |
| <b>An Innovation Towards Wastewater Treatment: A Comparative Study of Process Performance Between Granular and Conventional Systems</b><br>(Sunayna Dasgupta, Ramesh Goel - University of Utah) | <b>GRIT REMOVAL</b>   | <b>Startup Issues with a Primary Sludge Thickener</b><br>(Thomas Anderson - North Davis Sewer District)                    | <b>Cityworks Web GIS Centric Apps for Public Asset Management</b><br>(Billy Lang - Cityworks)   |
| <b>Carbon Management - Key to Successful Biological Nutrient Removal</b><br>(Henryk Melcer, Bryan Mansell, Kara Cash - Brown & Caldwell)  | <b>Grit Removal Considerations and Applications</b><br>(Walid Karam - Carollo Engineers)  | <b>Energy Recovery</b><br>(Jared O'Brien - Central Valley Water Reclamation)   | <b>But it's Not in my Job Description - Dealing with the Public</b><br>(Sydne Jacques - Sydne Jacques & Associates)                               |
| <b>Cyanobacteria: What You Should Know and Aquaponics as a Natural Treatment Regime</b><br>(Ken Burgener - North Davis Sewer District)  | <b>UTILITY MANAGEMENT</b>   | <b>Dilution/Solutions to Struvite Build-up on Belt Filter Presses</b><br>(James Magill - Central Valley Water Reclamation) | <b>From Paper to Pixels - How to Increase Your Productivity Using Mobile Devices in the Field to Complete Forms</b><br>(Matt Stayner - UtiliSync) |
| <b>Effluent Filtration - Expensive Process or Tool for Flexibility?</b><br>(Trevor Lindley - Brown & Caldwell)  | <b>ENVIRONMENT</b>  | <b>Reuse of Effluent Water at Magna Water District</b><br>(Tony Petersen - Magna Water District)                           | <b>AIRVAC Vacuum Sewer Systems</b><br>(Dean Ouellette - AIRVAC, Inc)  |
| <b>Micro-Screening Influent Biosolids to Improve Ponding Nutrient Removal While Generating Power</b><br>(Marcus G. Theodore - Earth Renaissance Technologies)                                   | <b>Harmful Algal Blooms</b><br>(Jodi Gardberg - State of Utah Division of Water Quality)  | <b>DISINFECTION</b>  | <b>Cretex Manhole Grade Rings</b><br>(Val Teeples - Ten Point Sales)  |
| <b>Utah's POTW Nutrient Performance</b><br>(Paul Krauth - State of Utah)  | <b>So What's with the Algae in Utah Lake?</b><br>(Theron Miller - Jordan River/Farmington Bay Water Quality Council)  | <b>Peracetic Acid - An Alternative for Wastewater Disinfection</b><br>(Greg Stevens, Mike Priest - MWH/Stantec)            | <b>And More.....</b>  |

The content of the technical program is subject to change. Check [www.weau.org](http://www.weau.org) for updates and schedule.



Water Environment Association of Utah

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# Water Environment Association of Utah



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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.

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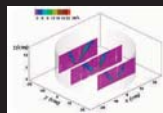
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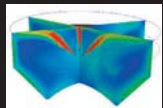


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## PWO


# Spotlight on James Magill

by Jared O'Brien

This quarter's spotlight for the *Digested News* is James Magill. James works here at Central Valley Water Reclamation as a Grade IV Mechanic in the maintenance department. James hired on at Central Valley Water as an operator in January of 2012. He worked in the operations department for approximately six months before transferring over to the maintenance department.



Before hiring on at Central Valley Water Reclamation James worked for twenty five years on drilling rigs. He worked on oil drilling rigs out in the oil fields as well as drilling water wells on a rig that he owned and operated. James was born in Lovington, New Mexico. He is married to his wife of twenty-five years, MaryAnn. They had two beautiful children together. They currently reside in Riverton, UT.

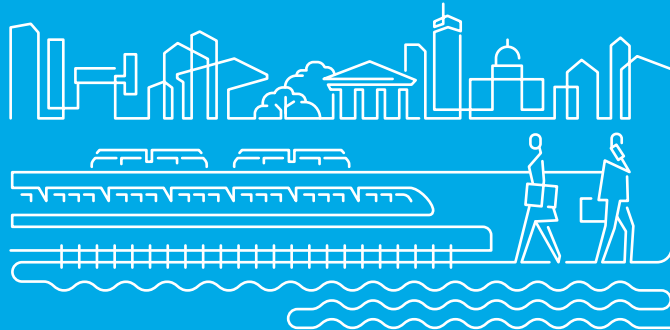
James really enjoys hunting. He likes to hunt waterfowl, upland game, and of course the big game as well. It's not uncommon for James and his family to spend weeks of time up on the mountain during the fall hunting season. James also enjoys playing softball, and he even enjoys umpiring softball more so. He umpires recreation ball, and all they up to college softball. James also does competition archery with his daughter. 

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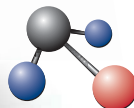
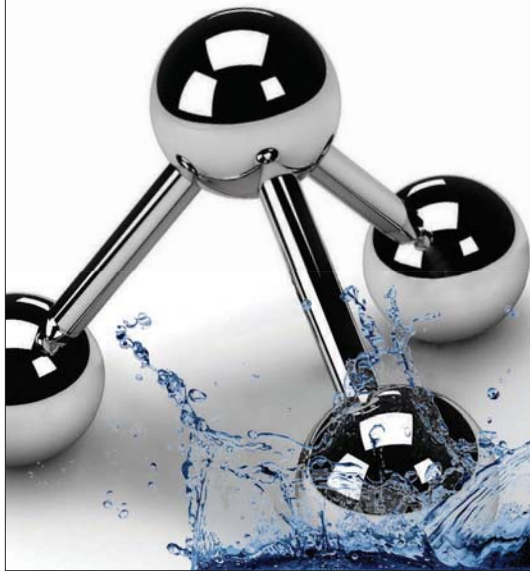
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# Biosolids Committee Field Report 2016

by Trace Workman

I thought I would take a minute to chime in and report on what has been happening within the WEAU's Biosolids Committee's efforts in the past year.


First off I've been quite fortunate to have had the opportunity to work with some great people the past few years in the WEAU organization. Especially the Biosolids Committee. Currently on the Biosolids Committee we have Michael McFarland, Dan Griffin, John Richardson, and Jim Harps who are all very knowledgeable and great to work with to get trainings together. We also have a great Board Liaison, Sarah Leavitt who I've worked with in the past on the Combined Committee Effort group. She does a super job at keeping us up to-date with anything we may need and is a great support line on the various trainings.

The past Biosolids Committee Chair, Tom Pendley, is great to consult with and still gives us great ideas for trainings. Tom is the one who thought it would be beneficial,

especially for operators preparing for the Treatment exams, to have specific training in a classroom setting. Then go out and see the taught material first hand in a treatment facility as we did here a few weeks ago on the Wastewater Treatment and Facilities Tour Training that was held at Snyderville's East Canyon plant. The training covered Biological Nutrient Removal in the classroom taught by Paul Krauth and Marlo Davis. After the classroom instruction, the group then toured Snyderville's East Canyon plant, which was led by Marlo and the Snyderville crew. They did a great job showing attendees Nutrient Removal first hand. Following the tour at Snyderville, we headed down to South Valley Sewer where we had more classroom time with the one and only Paul Krauth, who taught us the important aspects of Membranes which prepared us for a tour of the Jordan Basin WRF. At the plant, Gordon Evans gave us a great run down on his dealings

with membranes and how they work. We then had a smooth tour of the Jordan Basin facility given by Gordon Evans and a few of his operators. (Thanks B. Thacker)

Overall, the training proved to be a great success and those that attended went home with a broader knowledge of Wastewater Treatment and the new technologies here at work in Utah. I'd like to thank all who helped with the tours and give a big shout out to Paul, Gordon, and Marlo particularly for the classroom instruction and presentations and to all those that attended.

Please check [www.weau.org](http://www.weau.org) for upcoming trainings. A Digester Safety Training is planned for October 12 check the WEAU website for more info. There has also been discussion of another Biosolids Land Applier course for those that are considering taking the Land Applier Exam please contact me if you have an interest [traceworkman@outlook.com](mailto:traceworkman@outlook.com). 



# TWO US COMPANIES WIN THE 2016 CHINA BLUETECH AWARDS

June 16, 2016 | Shanghai, China



Los Angeles based industrial wastewater specialist, **OriginClear**, and Milwaukee-based stormwater company, **PaveDrain** have won the first ever China BlueTech Awards. The outstanding innovation of the two US companies along with the China market readiness of their technologies, impressed the judges of this prestigious new event co-organised by Mandarin Environmental and BlueTech Research.

OriginClear and PaveDrain competed against a field of 30 water and wastewater technology companies from Europe, Israel, and North America, all focused on demonstrating their technology's readiness for China market. Entrants included a wide spectrum of small and large capitalization companies with solutions across key industry submarkets, including industrial, municipal, biosolids, and stormwater.

Of the 30 entrants, six companies were shortlisted by judges and organizers and invited to have a presence in the BlueTech Innovation Pavilion at Aquatech China, China's largest and most important water industry expo.

The judges were impressed by OriginClear's advanced water cleanup technology, Electro-Water Separation™ (EWS), which is based on electrochemistry and will tackle China's most recalcitrant type of pollutants. Scalable, with a low operational cost, it will be incorporated as a modular add-on to existing water treatment sites in China or built as a standalone process flow.

Jean-Louis Kindler, President of OriginClear remarked, *"Winning this award is a strong endorsement and recognition of the attractiveness of our solution for the industrial wastewater treatment market in China. I want to thank everyone involved, especially the very impressive group of competitors whom all deserve equal recognition for their solutions for China's water and wastewater challenges."*

PaveDrain's solution for stormwater also captured the attention of the judges. The PaveDrain® system was created under the premise of allowing stormwater runoff from streets, roads, roofs and parking lots to quickly infiltrate into the ground. This places less stress on the sewer systems, can help reduce localized flooding and helps water infiltrate back into the groundwater table. Following over three years of research and development in North America, PaveDrain is now strategically aligning with China's Sponge City initiative to bring its infiltration system to China.

PaveDrain CEO Doug Buch commented on the recognition, "We had been looking for a way to demonstrate our solution to prospective Chinese partners, and the China BlueTech Awards represented exactly the right channel to accomplish this. We would like to thank the organizers, judges and sponsors for their time, and dedication to accelerating the path to market in China for international water technologies."


While both OriginClear and PaveDrain have recently inked agreements with

strategic partners in China, both companies are still relatively new to the China. The 2016 China BlueTech Awards competition has provided a compelling and high profile platform for demonstrating their entry into the Chinese market.

The other finalists in the 2016 China BlueTech Awards were:

- **AppliTek:** On-line analyzers, testing equipment, and monitoring solutions for water quality monitoring.
- **BDP EnviroTech:** Highly efficient biological wastewater treatment utilizing Biological Double-efficiency Process (BDP).
- **Dais Analytic:** Membrane distillation process for water purification
- **Hydro International:** Stormwater and wastewater solutions leveraging innovative vortex technologies.

Building on the success of the awards, **Mandarin Environment** and **BlueTech Research** are already turning their attention to the 2017 competition, which will continue to offer international water and wastewater technology companies a platform for demonstrating readiness for the China market. Technology submissions for 2017 China BlueTech Awards will be accepted between November 1, 2016 and January 30, 2017. The Awards Reception will again take place at Aquatech China.

For more information about the China BlueTech Awards, please contact Mandarin Environment's Ziyu Zhu at [zzy@mandarin-environment.com](mailto:zzy@mandarin-environment.com). 

# INVASIVE SPECIES

By Ken Burgener

**R**ecently I attended the Water Quality Technical Conference (WQTC) in Salt Lake City, UT. This conference highlights many of the problems we are facing around the US and Canada with water and its treatment. No one person or group has all the answers, but we have a lot of problems that need to be addressed. Our first article was about Cyanobacteria and the second topic from this conference is Invasive Species.

On a recent perusal of the internet I found a top ten list of invasive species. You can find it at <http://listosaur.com/science-a-technology/top-10-invasive-species-in-the-united-states/>. It is very interesting that number four on the list is the Zebra mussel. Quagga Mussel is similar viewed but is not on the list. "A very destructive pest in the Great Lakes region, the striped Zebra mussel was originally introduced into the United States by foreign cargo ships releasing their ballast water. Zebra mussels wreck havoc by choking water pipes, constricting flow to nuclear and hydroelectric plants. Further spread of zebra mussels through U.S. waterways occurs when the pelagic or free-floating larval stage drift down river, or recreational boaters unwittingly carry the mussels from one lake to another attached to the hulls of their boats. Zebra mussels now can be found in 29 states."<sup>1</sup>

From 1991 to March of 2016 the progression of this invasive species has proceeded largely unimpeded. One estimate from the conference was that the western states alone are spending over a billion dollars a year on control and

eradication matters. The costly effects reported now are largely problems at dams, aqueduct's, and water treatment facilities. However, future problems could be at wastewater facilities because of boats and water transport issues. It is a growing problem within the state of Utah. From the Utah DNR website we read the following.

"Just how serious is this problem?"

Once established, invasive mussels can cost billions of dollars.

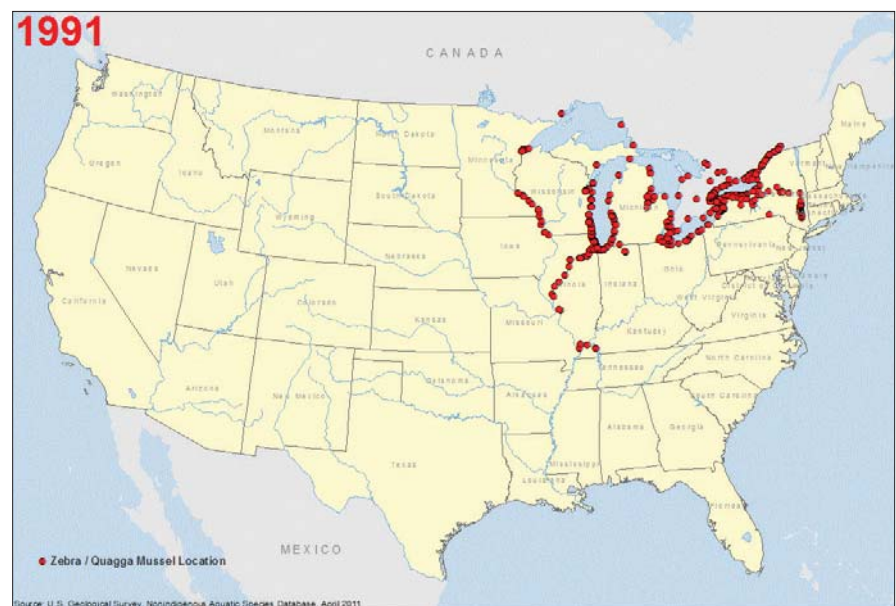
## **JEOPARDIZE POWER AND WATER INFRASTRUCTURES**

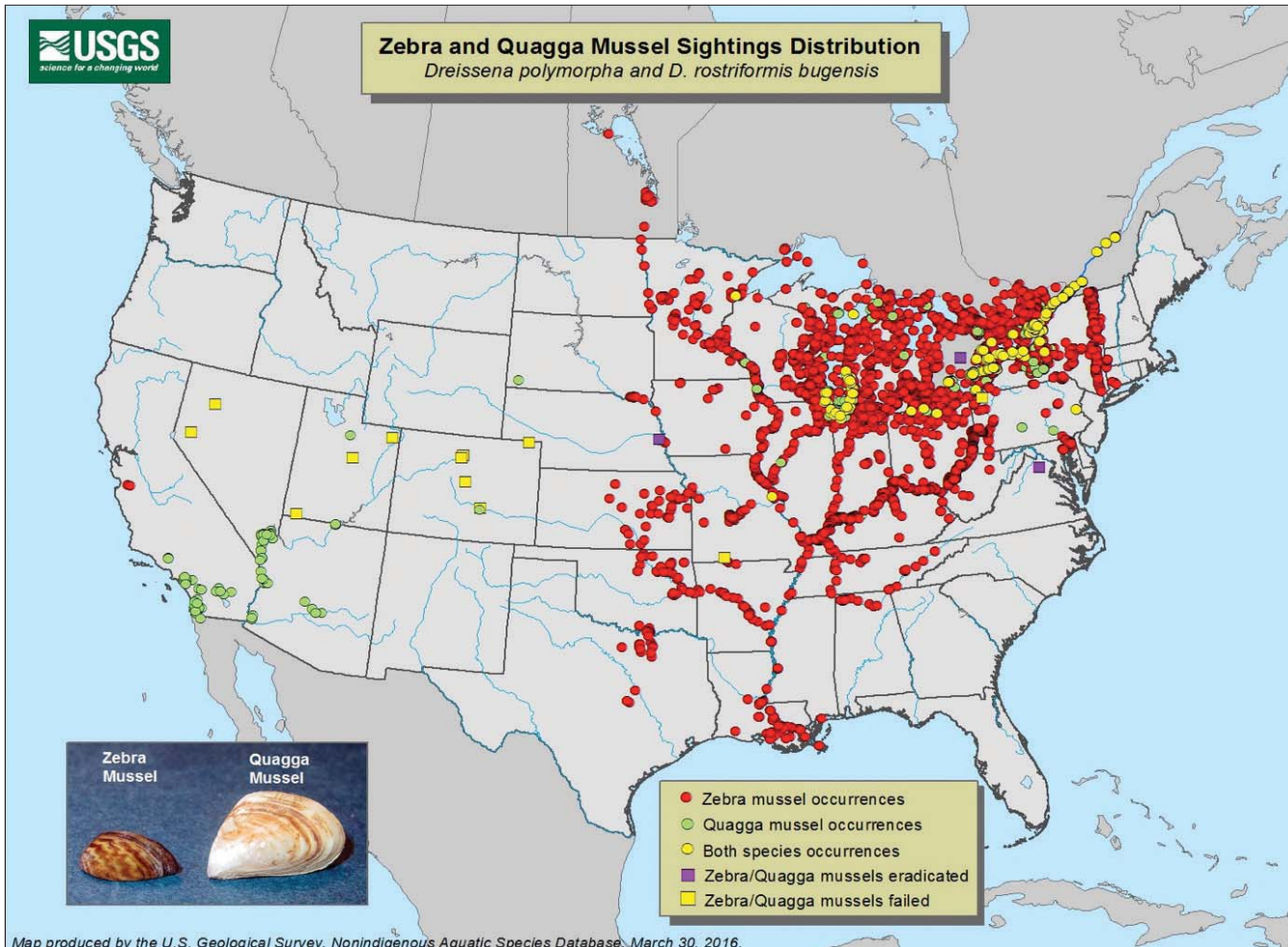
Invasive mussels reproduce rapidly and coat any stable surface – including water intake pipes. If these animals establish

populations in Utah, our water transport facilities will deliver less water and require additional maintenance (increasing your bill). They may also suffer temporary – but frequent – closures to remove mussels from equipment.

## **DESTROY YOUR FAVORITE RECREATION AREAS AND EQUIPMENT**

Invasive mussels reproduce so rapidly that their shells carpet beaches. These shells are sharp, so beachgoers will have to wear footwear at all times. The decaying mussels release a putrid smell that clings to the air and water. Finally, the mussels plug water circulation systems on watercraft, overheating motors that are costly to repair.





**COST BILLIONS OF DOLLARS TO CONTROL**

In the United States, zebra mussels cost the power industry \$3.1 billion from 1993–1999, with an impact on industries, businesses, and communities of more

than \$5 billion<sup>1</sup>. If mussels become established in Utah, they are predicted to cost the state \$15 million per year in increased costs – potentially driving up tax rates.”<sup>2</sup> **DTI**

<sup>1</sup> <http://listosaur.com/science-a-technology/top-10-invasive-species-in-the-united-states/>

<sup>2</sup> <http://wildlife.utah.gov/threats.html>



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# Big Data Making Waves in Utility and Investment Communities

Smart water infrastructure and big data are starting to attract funding both from investors and utilities after years of capturing the water sector's imagination. Automated Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) have been around for decades, but improved sensors, advanced analytics, and visualization tools are now enabling utilities to better partner and interact with their customers.

Smart water infrastructure technology has the potential to reform delivery of services while raising the quality of life by helping to make cities more sustainable and resilient. The smart city movement encompasses many facets, such as smart buildings, energy management, transportation connectivity, information connectivity high speed data networks, and, of course, water management.

Opportunities from smart city programs are exciting to contemplate, but two factors really serve as the primary drivers for a city or community to implement smart city initiatives – achieving cost efficiency and sustainability. In terms of actual implementation, water utilities trail natural gas and electric utilities in the implementation of smart initiatives. About a third of all natural gas utilities and one quarter of all electric utilities report being engaged in a smart city initiative, while only 15 percent of water utilities claim to be.

While smart water practices are increasing in adoption, the barriers to implementation in the water sector are generally well known and include siloed communication within the utility and between infrastructure sectors, the need to justify ROI, lack of budget, and lack of resources and expertise. Additionally, at the municipal level, sometimes short-term, high-visibility smart infrastructure projects such as street lights, digital kiosks, and electric vehicle charging systems may gain funding approval more easily than water-related initiatives. Master planning efforts to integrate water, energy, communications,

and transportation systems are complex and come with a longer time horizon, which might make them comparatively more difficult for decision makers.

Opportunities abound, however, such as the potential of cloud-based platforms to facilitate implementation of these big data solutions at utilities of all sizes. Small investments in hardware and software are required for cloud-based computing which aligns well with resource constraints of small and medium-sized utilities.

Utilities implementing smart water practices must consider six key aspects of a big data platform: integration, analytics, visualization, development, workload optimization, and security and governance. Integration is critical to have one platform managing the data, as separate silos of data only create separate silos of insight. An integrated solution has to be bigger than one technology. Analytics tools are used to analyze the data, providing more sophisticated, accurate, and actionable information. Visualization tools bring the information into a form that is understandable by decision makers, be they utility managers, government officials, or customers. Development tools are needed to enhance the analytical and visualization engines as well as support the overall platform. Workload optimization focuses on efficient processing and storage of the data. Security and governance are critical for maintaining the sensitive data that must be protected, which is especially important for public sector agencies including many water utilities.

As more and more utilities implement smart water practices, the opportunities to harness big data are growing rapidly. In March 2016, Imagine H2O announced the winners of its Water Data Challenge competition. These innovative startup companies provide an indicator of the momentum toward providing big data solutions. While water and many other resources have been called “the new oil,”

big data has earned this cliché moniker for nearly a decade as well. The big data analogy to oil is quite appropriate since oil has little value in its raw form, but when refined, it can power the world. The same can be said of big data. The water sector has a huge amount of data, but that data must be refined into information to spur utilities and customers to knowingly take action.

Sensors are one of the biggest sources of big data, and the water sector is particularly rich in sensor data. Smart metering, inventory management and asset tracking, fleet management, SCADA systems, and water quality instrumentation are major sources of sensor data.

The Nutrient Sensor Challenge exemplifies one effort to advance sensor technology. The Challenge is an innovation effort to accelerate the market for the development, adoption, and use of sensors to measure nitrate and orthophosphate in water. The goal is to encourage development of sensors that are affordable (less than US\$5,000 purchase price), reliable (unattended operation for 3 months), and can provide accurate real-time data. The Challenge, which seeks to accelerate these new technologies to commercial availability by 2017, is being sponsored by Alliance for Coastal Technologies (ACT). ACT is a partnership of research institutions, state and regional resource managers, and private sector companies, supported by US National Oceanic and Atmospheric Administration (NOAA) and Environmental Protection Agency funding, whose purpose is to develop, improve, and apply sensor technologies to study and monitor coastal environments.

Private investment from venture capital firms are helping companies that provide solutions associated with many aspects of big data platforms to advance at a rapid rate. For example, XPV Water Partners (Canada), one of the world's leading institutional water funds, counts the US

firm FATHOM as one of their portfolio companies. Based in Phoenix, Arizona, FATHOM is a software-as-a-service, cloud-based, geospatial data integration platform helping to enable water utilities of all sizes to unlock the power of their meter and customer data in order to increase revenue, decrease costs, and delight customers. Emerald Technology Ventures (Switzerland) recently invested in Optimatics, an Australian firm providing infrastructure planning software that uses genetic algorithms to optimize capital investment for water and wastewater utilities.

Imagine H2O, a global water innovation accelerator, conducts water infrastructure challenges that produce companies advancing technologies for analytics, sensors, and visualization. From the analytics arena, 2015 winner Valor Water (San Francisco, California, USA) provides customer sales analytics software to water utilities to address revenue risk, affordability, and supply management. Finalists included FLOWatch (Wynnewood, Pennsylvania, USA), which provides integrated asset management software for water and environmental systems operators, and Dropcountr (Redwood City, California, USA), who uses data analytics and mobile apps to communicate water usage and metrics to consumers and utility staff. On the topic of sensors, finalist Lumense (Atlanta, Georgia, USA) is developing a real-time, continuous sensor platform for monitoring chemicals and biologicals in water, while fellow finalist Aquarius Spectrum (Israel) features a near real-time, automatic water pipe

monitoring tool for leak detection based on acoustic sensing.

Like Imagine H2O, The BREW accelerator program at the Water Council in Milwaukee, Wisconsin, USA has seen an increase in big data-related participants from the city. The most recent class included Optiktechnik, which makes laser-based, optical sensors and instrumentation to improve monitoring and control of key particle processes in water and wastewater treatment. Radom creates instrumentation to identify toxic trace metals in water, wastewater, industrial processes, and food and drugs. Current Data is a watershed-focused water quality data collection and information system using a sensor array and mobile app with cloud storage and analysis tools to lower the costs of data collection and increase its use in critical water quality decisions. In the BREW's inaugural class, Meter Hero focused on water consumption data and social networking to drive conservation programs.

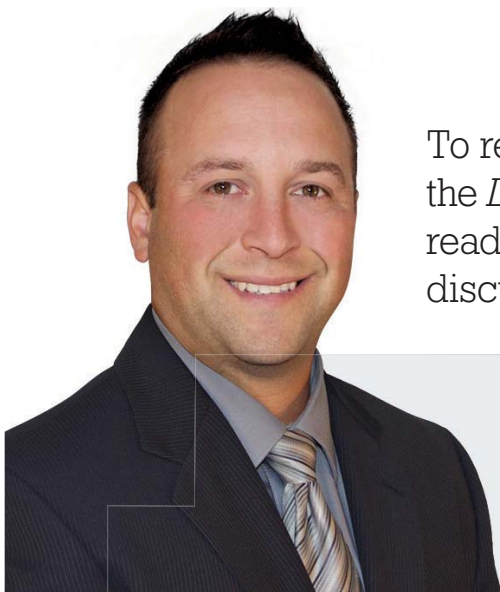
Drinking water and wastewater are not the only categories of water sector advances in big data. On the groundwater front, Wellntel, provides a real-time understanding of well and surrounding water table dynamics, provided through constant measuring and reporting of water levels. Both Imagine H2O and the Water Council's BREW program recognized this firm for its innovation. Managing stormwater in real time is the focus of both EmNet and OptiRTC, while companies like H2Ometrics provide cloud-based visualization tools to better plan stormwater and sewer operations.

Cloud-based solutions provided by innovators will help water utilities of all sizes advance smart water infrastructure. Smart water innovation has even emerged from firms better known for other IT sectors such as network giant CISCO or mobile devices leader Qualcomm. With innovations developed by entrepreneurial startups and large companies including IBM, GE, and OSIsoft, an exciting future is already underway for big data solutions in smart water infrastructure. **DN**

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**Barry Liner** is the director of the Water Science & Engineering Center at the Water Environment Federation (WEF).



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# How Do You Find the Cost of Grit – then Cut it Out?

By Keith Hutchings, Senior Market Development Engineer, Hydro International

**E**very operator knows that grit is seriously bad for treatment plant operation and maintenance - but just how bad? How much does the impact of grit equate to in cold, hard cash - and, more importantly - how can a demonstrable Return on Investment be calculated to justify more effective removal at the headworks?

Times are changing and greater focus on life-cycle asset management and condition monitoring means operators are actively looking for ways to take out O&M cost and improve performance. In this context, grit has become a major target for efficiency gains.

## Asking the right questions

As a basic starting point, an operator, or engineering consultant, could consider the following questions objectively:

- *Do you ever have to replace pumps and valves due to abrasion wear? Have you had to invest in special abrasion resistant materials to try and reduce the wear?*
- *Do you ever have to clean out pipes and channels because of accumulating debris at dwell points or in long, low velocity flows? How much time does this task take, even every few years, and how much does that time cost?*

*treatment off site, when your sludge treatment processes frequently (once or twice a year) need maintenance?*

## Are costs being assigned properly?

It's highly likely you answered yes to many of these questions and all of them could be a consequence of a grit menace. The problem is that O&M engineers often consider that each of the costs belong to the separate ongoing O&M budgets, assigned to different parts of the plant.

Surely, if there were a single common factor as a cause of these separate costs, and removal of this factor would minimise each of these costs, a significant total savings opportunity would open up for the entire plant?

That single common factor is the load of grit and sediments that is carried in surface water into our sewers, then passes through inlet screens and inefficient grit removal equipment. Hydro International's experience of working in North America, in particular, has shown that plants may often be only removing a small percentage of the total grit carried in raw water. Now our sampling work in the UK, and internationally, is replicating this experience. Unrecovered grit makes its way into all downstream processes.

A colleague was in conversation with a senior asset manager from a treatment plant operator recently who said: "We can't have a problem with grit in our wastewater plants because we have no budget for treating it."

By this he meant that if a specific problem had been identified, someone would already have designated money for it. The sub-message was: with no allocation, no money was available so it was easier not to acknowledge the possibility of a grit problem at all, than to understand the problems.

## “Grit may seem a simple enough substance, but its impacts on plant operation can be complex.”

Grit may seem a simple enough substance, but its impacts on plant operation can be complex. So how can asset managers or maintenance teams make reliable decisions about effective grit removal, especially when they lack accurate data that measures its impact? Often, they have simply relied on industry-standard guidelines for the design of their grit removal equipment.

Finding accurate evidence of the cost of grit has always been a challenge for operators – especially when justifying installation of more advanced removal technologies that take out more, finer grit before it does all that damage to downstream equipment and compromises processes like aeration and anaerobic digestion. For too long, downstream grit has, therefore, been reluctantly accepted as a fact of life, and its impact lost in the regularity of annual maintenance and repair budgets.

- *Has the flow rate through your treatment plant diminished after it was installed? Do you know by how much compared to the design flow? How is this affecting your plant's efficiency? How efficient are your essential processes such as aeration tank and anaerobic digesters? Has their efficiency reduced, and if so, by how much?*
- *Has your power consumption for moving water around the plant gone up by more than the cost of electricity? Is this because the pumps used in mixing, aeration, sludge pumping, feeding digesters and tanks, supplying air; have all become less efficient? Has your power consumption to aerobically treat your flow increased?*
- *Have you invested in extensive alternative redundant plant so you can take parts of your process off-line for cleaning out and maintenance, or even tanker sludge or other liquids for*

### Are design criteria correct?

How can a situation have persisted for so long, where so much grit is being missed across our industry worldwide? As mentioned earlier, design engineers and operators have had no option but to trust industry-standard design guidelines.

The problem is, this standard industry guidance goes back more than 70 years and is outdated and, frankly, wrong. Many design standards for countries across the world, including the US and UK, can be traced back to this assumption.

Based on these guidelines, conventional grit removal designs usually target 95% removal of grit particles of 200 micron or greater. The conventional standard has assumed all grit is spherical silica sand, with a diameter of 212 micron, and a specific gravity (SG) of 2.65. This is changing in the USA, where the Metcalf and Eddie MOP 8 design guide now recognises the existence of grit smaller than 212 microns.

Hydro International's experience of working with more than 400 treatment plants over more than 30 years shows that the majority of grit carried in surface water flow is, in fact, smaller than 200 microns in diameter.

The way grit settles in wastewater is complex, governed by a number of factors including size, specific gravity, shape and tendency for agglomeration. A range of materials, including soil and organic matter that are relatively light, and carried along easily in storm flows yet settle out when the flow rate and velocity diminishes, e.g. in tanks and basins. It's a little like comparing a bag of sand with the same sized bag of compost. Most grit is smaller and lighter than the standard against which conventional equipment is designed.

### Calculating Pay Back

Many treatment plants are already experiencing the process and O&M efficiencies gained by targeting to remove 95% of all grit 75 microns and greater from raw incoming waters after mechanical screening.

For others, the good news is that savings can easily be calculated and used to justify upgrading equipment. It may take less time than you think to recover the investment in improved operation and energy use.

These sample calculations of the cost of grit at an average treatment plant, using actual costs taken from the middle of the range for typical plants, show the extent of the mismatch, and how much it can add up to.

## “If existing grit removal technology in any one plant is more than ten or 15 years old, payback on high performance grit removal could be almost immediate.”

Studies made by sampling the inlet channels at wastewater treatment plants have shown that conventional grit removal of particles 200 microns and above may remove only 13% of the particle load on wet days, when 70% of grit arriving at the plant occurs. On dry days, when the particle load is low anyway, it may only remove 43%. The rest of the grit from 200 micron down to 70 micron and below is allowed through. This gives an overall removal efficiency of only 22% of the overall grit load arriving at the plant.

### An Example

If a conventional grit system removes around 2000 tons per year, the total actual grit load (100%) arriving is 9090 tons a year. As a result, 7090 tons of grit a year (78%) is finding its way into downstream processes.

If an Advanced Grit Management® system were installed to remove 90% of the same total grit load, it would be possible to catch 8181 tons per year; as a result, 6081 tons extra would not have to be cleaned out of downstream processes.

Operating efficiency would be improved: equipment abrasion wear could be reduced by up to seven times. Clearing out digesters and aeration tanks would be needed less often; if currently every five to ten years, this could be extended to twenty years or more. Lower down time means less plant disruption.

Processes would also have more capacity because there would be less build-up in tanks, less blanketing of biological processes and clogging of aeration nozzles.

Minimizing energy consumption is a major concern for all wastewater treatment

plants, especially for those with aeration systems, which can consume up to 65% of the net power demand of a typical plant using an activated sludge process. Energy studies at wastewater treatment plants also indicate that every for every 1% of grit, 1% extra electricity is required, to compensate for these less efficient processes and to pump the extra grit around the plant.

Figure 1 gives a typical average cost for a 20 million gallon per day (MG) waste water treatment plant, based on data from actual treatment plants, and a 25 year life cycle.

Using mechanically induced vortex (MIV) grit separation technology as an example and based on typical average efficiency of grit removal for all grit with particle sizes of 106 micron and larger, savings from major cost centres can be quantified as follows:

Quantifying this on an annual basis averaged over 25 years:

- Current typical annual costs using MIV grit removal technology: \$350,468
- Typical annual savings, using AGM grit removal technology: \$284,342

This means that operating costs could be an average of just \$66,126 annually, a saving of better than 80% in annual running costs.

Cost benefit analysis for a high performance grit removal system indicates that, over a range of populations from 25,000 to 500,000, payback would be between four to eight years. With plant design life of 25 years plus, an operator could easily benefit.

If existing grit removal technology in any one plant is more than ten or 15 years old, payback on high performance grit removal could be almost immediate once

| Savings made over 25 years using Advanced Grit Management® Technology | US\$      |
|---|-----------|
| Grit tank / channel cleansing   | 1,703,775 |
| Refurbishment of primary clarifier                                    | 2,628,300 |
| Digester cleanout   | 1,192,400 |
| Pump wear / maintenance   | 1,115,575 |
| Centrifuge wear   | 405,650   |
| Aeration basin cleanout   | 155,775   |
| Total savings   | 7,108,550 |

Figure 1

# “There is no substitute for a detailed site assessment of real-world grit concentration and behavior, and actual sampling of incoming effluent prior to a detailed plant design.”

the existing deposits and damage have been cleared and made good, thanks to the immediate reduction in operating, maintenance and running costs.

## Cost of Grit Calculator

For manufacturers of grit removal technology, like Hydro International, who work with treatment plants across the world, collating and comparing operating data is now much more possible with growing experience. Easy access to digital platforms also provides opportunities to share this data with other professionals worldwide.

Hydro International has a new calculation tool, freely available for anyone to use worldwide, which we've called the Cost of Grit Calculator based on operating data from working with treatment plants across the world.

Where operational costs are not readily available, grit impacts and potential savings can be swiftly assessed using the calculator – and the outputs could be used as an aid to justifying investment decisions. It's also a very useful ready reckoner and a good tool for trying out 'what if' calculations, too, all based on actual profiles of plants across a wide range of locations with varying climatic and environmental conditions.

## Advancing Grit Removal Performance

The calculator is based on the principles of Advanced Grit Management®, a robust approach to the problem of removal of grit from raw wastewater at the inlet to treatment plant. Proven in a very wide range of locations, environments and climates, its science is based on a thorough understanding of grit content and behavior, and high performance engineering which can be guaranteed to remove up to 95% of specified grit that would otherwise enter a plant.

An overview of the science behind Advanced Grit Management® and real operating experience of its benefits can be found at [www.advancedgritmanagement.com](http://www.advancedgritmanagement.com).

## Grit Removal System

The HeadCell® is the most advanced multiple tray separation technology designed to remove up to 95% of grit solids 75 microns and greater from raw incoming waters after mechanical screening.

The stacked tray design of the HeadCell allows sizing to suit a wide range of flows and grit profiles, with only 1' of headloss. With a small footprint compared to mechanical separation and settlement basins, HeadCell® can be easily incorporated as a retrofit solution or for new plants.

The technology is equally adaptable for potable water sediment removal, wastewater plants, industrial feedwater and effluent, and for

pre-treatment and protection for advanced processes such as MBR.

For optimum performance, with less than 15% volatile solids and greater than 60% total solids, HeadCell® should be paired with the most appropriate Hydro International washing and dewatering equipment .


## Justifying an investment

Making a case for improved grit removal in a treatment plant may not be such a challenge as first thought. By sharing and comparing operating data from plants worldwide, broad conclusions can be drawn that can help move an investment argument forward.

Every plant is different and there is, of course, no substitute for a detailed site assessment of real-world grit concentration and behavior, and actual sampling of incoming effluent prior to a detailed plant design.

However, there can be no doubt that poor grit removal is a major source of avoidable process inefficiency, operating, maintenance and replacement costs as well as contributing to unnecessary energy usage. This conclusion alone, should be sufficient, to prompt any operator to begin investigating the opportunity that grit presents to make O&M savings.

For more information about Advanced Grit Management® and Hydro International grit removal technologies, please call 01353 645700, email [enquiries@hydro-int.com](mailto:enquiries@hydro-int.com) or visit [www.advancedgritmanagement.com](http://www.advancedgritmanagement.com).

For advice, knowledge or grit removal product information email [WWInquiryUS@hydro-int.com](mailto:WWInquiryUS@hydro-int.com) or visit [www.advancedgritmanagement.com](http://www.advancedgritmanagement.com). 



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There is not a Treatment Certification Exam Preparation available this fall. But there are other options to help you study for the Exam.

California State University at Sacramento at  
<http://www.owp.csus.edu/courses/wastewater.php>

American Water College at <https://americanwatercollege.org/weau/>. They have offered WEAU a discount you can go to their website, scan the QR Code or call them at 661-874-1655. The discount code is WEAUtah. Classes are available for Grade 1 through 4 for wastewater and collections. This is an online program to help you work at your own pace with printable lessons, online videos that go over each lesson, with flashcards, quizzes, tests, support of an instructor and study helps.



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# Grit King® Cuts Maintenance and Operating Costs at Pennsylvania WWTP by over 80%

**P**oor headworks grit removal at the Mon Valley Sewage Authority Wastewater Treatment Plant (WWTP) was costing the plant nearly \$20,000 in annual maintenance and repair bills. By replacing the original grit system with Hydro International's Grit King® advanced hydrodynamic separator, annual maintenance and repairs have been almost eliminated.

The Authority's WWTP serves the Borough of Donora in Washington County, Pennsylvania and the City of Monessen in Westmoreland County, Pennsylvania. Both communities are in the historic 'Mon Valley' steel and coal industrial area close to the Appalachian Mountains. All domestic and industrial water supplies are extracted from and returned to the Monongahela River.

"The presence of water for steel and coal extraction and processing was a key factor in establishing the area in the late 19th century," relates Thomas A. Salak, General Manager at the WWTP. "In the early days, water was being re-used without much regard for sanitation or health, but then a series of initiatives for treating industrial and domestic sewage was undertaken during the 20th century."

## Legacy of heavy industry

Now part of the so-called 'Rust Belt' region of the United States, Donora and Monessen have seen the demise of heavy steel, wire-making and coal industries. Still, relics of the regions proud industrial heritage are evident all around and this legacy is also evident in the sewage and drainage collection network serving the treatment plant.

"As a result of the long history of incremental development of the sewer network in the area, the sewage entering

**"In addition to this costly maintenance regime, the inefficient grit removal system allowed a large quantity of grit to pass into downstream processes, particularly during times of high flow."**

the plant is fed by combined sewers that carry surface water runoff as well as domestic sewage," explains Salak.

"Because we often have heavy snowfall in the winters, roads are treated extensively with grit for traction control. After the snow melts, or especially after heavy rainfall, a lot of grit ends up in the treatment plant."

## Maintenance cost problems

Before the new system was installed, headworks grit removal consisted of grit sedimentation channels with scrapers and chains to regularly pull the piles of settled grit aside for disposal. A twin channel arrangement allowed the WWTP to divert all flow through one channel at low flow periods in the summer, to allow for the other to be cleaned out.

"The grit build up was approximately 3 cu.ft. per day," recalls Salak. "It was removed once a year, as part of annual downtime for maintenance. I estimate it cost us approximately \$20,000 in terms of maintenance every year, in labor and hiring vacuum trucks, to extract the settled grit for disposal. The chains and scrapers also needed frequent replacement as they wore out; new parts cost around \$40,000."

## Downstream wear costs

In addition to this costly maintenance regime, the inefficient grit removal system

allowed a large quantity of grit to pass into downstream processes, particularly during times of high flow.

Efficient sludge collection in particular was negatively affected. Grit accumulated in the settled sludge before being pumped for dewatering and disposal. Despite using twin lobe rotary pumps with anti-abrasion rubber linings, the pumps suffered extensive wear and had to be replaced every two to three years, adding to operating or maintenance costs. In other areas, equipment also had to be replaced frequently as a result of excessive wear, for example in the aeration system.

## Solution pays back on investment

To reduce the excessive cost burden at a time when budgets were tight, the Authority recognized the payback it would gain from a new grit management system as part of headworks upgrade and the return on investment from savings in maintenance and operating costs.

Completed in 2013, the new headworks includes a 15 mgd Grit King® grit removal system from Hydro International. The Authority's Consulting Engineer, Mr. Jason McBride, P.E. worked with Mr. Salak to develop a system which would fit neatly into the headworks space, incorporating a ½ inch screen to remove trash and floatables before the grit system.

“Hydro International’s engineers worked very closely with us to ensure the Grit King® was configured to our requirements which were to remove 95% of grit above 150 micron and larger during peak flow, and wash and classify it for landfill disposal,” states Salak. “The Grit King® process operates on a regular basis throughout the year and we have retained a grit channel as a bypass for when the Grit King® is being serviced for annual maintenance.

“Due to service requirements now being much quicker and easier, with less need for outside contractors with vacuum trucks and labor, our annual maintenance costs are negligible. We haven’t yet quantified any reduction in other costs such as wear on other downstream facilities, as we haven’t had to replace much yet. But even based on annual maintenance, we are looking at a favorable payback period.”

## “It does everything it claimed, so it exceeds my expectations.”

### Advanced separation


The Grit King® solution from Hydro International is an advanced hydrodynamic separator, together with a grit washing / classification unit. Flow is introduced into the Grit King® via a tangentially positioned inlet causing a rotational flow path around a dip plate. The flow spirals down the wall of the chamber as solids settle out by gravitational and rotational forces.

The grit collects in the grit pot as the center cone directs flow away from the base, up and around the center shaft into the inside of the dip plate. The upward flow rotates at a slower velocity than the outer downward flow. The resulting “shear”

zone scrubs out the finer particles. The concentrated grit underflow is pumped or gravity fed to a grit classifier for dewatering from the bottom of the Grit King®.

### 100% satisfaction

“We are totally content with the Grit King® set up and we are 100% satisfied after two years of operation,” concludes Salak. “It does everything it claimed, so it exceeds my expectations - normally it’s good if you are within 80% of claimed performance!”

For further information email [wastewaterinquiry@hydro-int.com](mailto:wastewaterinquiry@hydro-int.com), visit [www.advancedgritmanagement.com](http://www.advancedgritmanagement.com) or [www.hydro-int.com](http://www.hydro-int.com) or call (503) 615 8130. 



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# Dear Wastewater Professional:

The Biosolids Committee is pleased to offer a valuable **Digester Training and Facility Tour** of the North Davis Sewer District. A delicious LUNCH will also be provided. The training will be focused on digestion and the safety and maintenance associated with working with all aspects of Digesters. It is also a great opportunity to share experiences with your colleagues and see some new technologies.

Please go online to [www.weau.org](http://www.weau.org) to register and pay online OR complete the registration form below and return it with your check made out to WEAU. Payment is due at the time you register. We look forward to seeing you there.

- Date: October 12, 2016
- Registration Deadline: October 7, 2016 (Enrollment is limited to the first 45 registrants)

- Training Title: Digester Safety Training and Facilities Tour
- Time: 8:00-3:30pm
- CEUs offered: 0.6
- Location: North Davis Sewer District 4252 W. 2200 S. Syracuse, Utah. 84075


### Agenda

- 8:00-8:30am Registration
- 8:30-9:00am ND Presentation: Digester Safety Presented by Curt Simmons/WEAU Safety Committee
- 9:00-9:45am ND Presentation: Digester Safety Devices and Maintenance Presented by Myron Bachman
- 9:45-10:00am BREAK
- 10:00-10:30am ND Presentation: Digester Gas Hazards Presented by Ken Bergner
- 10:30-11:30am WesTech Presentation: Digester Accessories and Technologies

- 11:30-12:30pm Lunch
- 12:30-1:30 WesTech Presentation: Digester Accessories and Technologies
- 1:30-1:45pm North Davis Plant Overview
- 1:45-3:30pm North Davis Plant/ Digestion Facility Tour

### Cost for Training

- WEAU Members – \$30.00
- Non-members without membership - \$45.00
- Non-members (including a one year PWO membership) - \$70.00
- Reservation Deadline: Please register before Oct, 7 2016, it will be open to the first 45 Registrants.

Call Trace Workman (801-725-7594) with any questions or email: [traceworkman@outlook.com](mailto:traceworkman@outlook.com) 

Detach bottom portion and mail with payment. (Please print clearly)

## Registration Form Digester Training and Facility Tour

Name \_\_\_\_\_

WEF Membership No. \_\_\_\_\_

Email Address \_\_\_\_\_

Company Name \_\_\_\_\_

Phone No. \_\_\_\_\_

You may register online at [www.weau.org](http://www.weau.org) and pay by credit card or Mail checks (payable to WEAU) and completed registration form to:

**Trace Workman/WEAU**  
Central Davis Sewer District  
2200 South Sunset Dr.  
Kaysville, Utah 84037



# WEAU Summer Picnic and Salt Lake Bees Baseball Game

By Ben Skousen, P.E.



WEAU members and their families/friends got together Friday, July 8 for the annual WEAU summer picnic and Salt Lake Bees baseball game. We had a tremendous turnout with over 100 WEAU members and guests in attendance. The Bees provided a private deck - complete with burgers, dogs, drinks, and desserts - overlooking 3rd base with seats located directly below. Just before the game, WEAU held a raffle with over \$800 in prizes. Everyone was treated to a good game against the El Paso Chihuahuas. Big thanks to the Young Professionals Committee for organizing and running the show!

Hope to see everyone out next year and at future events! Make sure to sign up for the WEAU mailing list by sending an email to [membership@weau.org](mailto:membership@weau.org) and stay in the loop. WEAU Young Professionals and Students Group (YP's) also have a digital newsletter, sign up by emailing [yp@weau.org](mailto:yp@weau.org). [D1](#)

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# Dear House of Delegates Leaders:

I am writing to provide important information about an action approved in July by the WEF Board of Trustees. Specifically, the board approved a 5% membership dues increase effective January 1, 2017 (see attached) and wanted to ensure that our Member Association (MA) leaders are provided with both early notice and also background regarding related increases in member service and value.

While this increase is not part of the overall plan developed in 2013, the WEF Board deliberated carefully before deciding on a dues increase for 2017. The decision was influenced by increasing costs of doing business and by a desire to continue investing in services to members and MAs, innovation and new practice areas. The Board's goal is to continue to grow services while maintaining a sustainable and nimble business model. WEF is investing in your professional organization to ensure you have what you need to be successful in the water sector.

Although WEF dues continue to be competitive when compared with those of other national and international water organizations, the Board remains strongly focused on growing member value. We also are focused on operating an efficient organization with a low overhead in order to maximize member service and enhance the member experience. WEF's Strategic Plan supported by a business plan and success metrics will allow further resource alignment.

Examples of the service enhancements that have been or that will shortly be delivered with the 2015 and 2016 dues increases include:

- Utility of the Future Today Recognition Program
- Expanded WEF Stormwater Program, including a new Stormwater Institute and increased service to MAs on stormwater programming
- Increased service to Member Associations through establishment of the new Association Engagement Department and additional staff resources
- Enhanced services for the Student and Young Professionals (YP) Programs such as funding for more students to attend the WEF midyear meeting and water leadership events
- Development of new websites that will provide improved mobility and support, and an enhanced the engagement experience with a first-rate search engine (launch in December 2016)
- Highly regarded technical webcasts at no cost to WEF members
- Developing a comprehensive Risk Management Program that reduces WEF financial risk through smart financial planning

The 2017 dues increase will be used to support the priority Operator Initiative, WEF Risk Management Program, a dedicated MA staff in the membership department and defray the increase in insurance costs and other costs at our headquarters building.

We hope that these examples of the ways we have increased our value to members and MAs give you a sense of our resolve to provide water professionals with the tools and support they need to succeed in their careers and in the important work that they do every day.

Our partnership with MAs is vital not just to the achievement of our mission but to our organizational sustainability. We therefore are providing you with early notice of the planned dues increase detailed in the attached Q&A document, and of course, are available to answer your questions. We are sensitive to your need to reflect on your dues for 2017, and this year again will delay sending out our 2017 renewal notices to give our MAs more time to plan and coordinate with us.

Later this month you will receive the 2017 Member Association Dues Report Form. The due date of October 7, 2016, is intended to give you time to consider and notify us of your 2017 dues.

If you have questions, or specific concerns about implementation of the 2017 dues increase, please do not hesitate to contact the key staff listed at the end of the Q&A document, or me personally at (703) 684-2430. As always, we greatly appreciate your leadership and service.

Sincerely,  
Eileen J. O'Neill, Ph.D.  
Executive Director  
[eoNeill@wef.org](mailto:eoNeill@wef.org)

## Questions/Answers - WEF 2017 Membership Dues Increase

### How much will the WEF membership dues increase in 2017?

WEF will be implementing a 5% dues increase for all membership categories except Students with all renewals and new memberships beginning January 1, 2017.

#### 2016 2017

Professional \$133 \$140  
Professional-Low Income \$47 \$49

Academic \$133 \$140  
Executive \$295 \$310  
e-Global \$30 \$32  
Retired \$20 \$21  
PWO \$71 \$75  
Young Professional \$47 \$49  
Student (no change) \$20 \$20  
Corporate \$350 \$368

### When will the 2017 membership dues increase be implemented?

The dues will be effective January 1, 2017, and will be reflected in renewal notices generated beginning in November 1, 2016.

### When does my Member Association (MA) need to notify WEF of the level of our 2016 dues?

The deadline for notifying WEF of 2017 MA dues is October 7, 2016.

## Why are the membership dues being increased?

While this increase is not part of the overall plan developed in 2013, the WEF Board deliberated carefully before deciding on a dues increase for 2017. The decision was influenced by increasing costs of doing business and by a desire to continue investing in services to members and MAs, innovation and new practice areas. The Board's goal is to continue to grow services while maintaining a sustainable and nimble business model. WEF is investing in your professional organization to ensure you have what you need to be successful in the water sector.

Although WEF dues continue to be competitive when compared with those of other national and international water organizations, the Board remains strongly focused on growing member value. We also are focused on operating an efficient organization with a low overhead in order to maximize member service and enhance the member experience. WEF's Strategic Plan supported by a business plan and success metrics will allow further resource alignment.

Examples of the service enhancements that have been or will shortly be delivered with the 2015 and 2016 dues increases include:

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- Highly regarded technical webcasts at no cost to WEF members
- Developing a comprehensive Risk Management Program that reduces WEF financial risk through smart financial planning

### How will the 2017 dues be used?

The 2017 dues increase will be used to support the priority Operator Initiative,

WEF Risk Management Program, a dedicated MA staff in the membership department and defray the increase in insurance costs and other costs at our headquarters building.

### Who should we contact if we have questions?

For logistics regarding implementation, please contact:

- Alison Heron, Senior Director of Membership, [aheron@wef.org](mailto:aheron@wef.org) or 703-684-2400 x7741
- Penny Young, Deputy Executive Director/CFO, [pyoung@wef.org](mailto:pyoung@wef.org) or 703-684-2425

For more detailed Q&A information, please contact:

- Tim Williams, Deputy Executive Director, [twilliams@wef.org](mailto:twilliams@wef.org) or 703-684-2437
- Penny Young, Deputy Executive Director/CFO, [pyoung@wef.org](mailto:pyoung@wef.org) or 703-684-2425
- Linda Kelly, Sr. Director of Association Engagement & Governance, [lkelly@wef.org](mailto:lkelly@wef.org) or 812-883-0072
- Dianne Crilley, Director, Member Association Programs, [dcrilley@wef.org](mailto:dcrilley@wef.org) or 703-684-2400, x2445
- Eileen O'Neill, Executive Director, [eoneill@wef.org](mailto:eoneill@wef.org) or 707-684-2430. [DN](#)

## SJWP Competition

Utah SJWP winner, Raymond Li. Raymond won the award for the best video on his research.

### National Winners Below:

2016 SJWP Winner \$10,000

#### **Nishita Sinha – New Jersey**

*Experimental Studies in Developing Safe Sanitation Solutions*

2016 Runner-Up, \$1,000

#### **Paige Brown – Maine**

*Constructing Low Cost Calcium Alginate Based Scaffolds for Pollutant Reduction*

2016 Runner-Up \$1,000

#### **Megan Lange – Alabama**

*Removal of BTEX from Storm Water Using Nanoparticle Enhanced Reactive Porous Concrete: Field Testing and Modeling*



2016 Bjorn von Euler

Innovation in Water Award \$1,000

#### **Sarayu Das – South Carolina**

*The effect of trisprintec and metformin and their doses on the*

*mortality and reproduction of Ampullariidae, Daphnia magna, and Lemnoideae & the heart rate of Daphnia magna in aquatic ecosystems* [DN](#)

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