

FALL  
2024

The Official Publication of the Water Environment Association of Utah

# DIGESTED news

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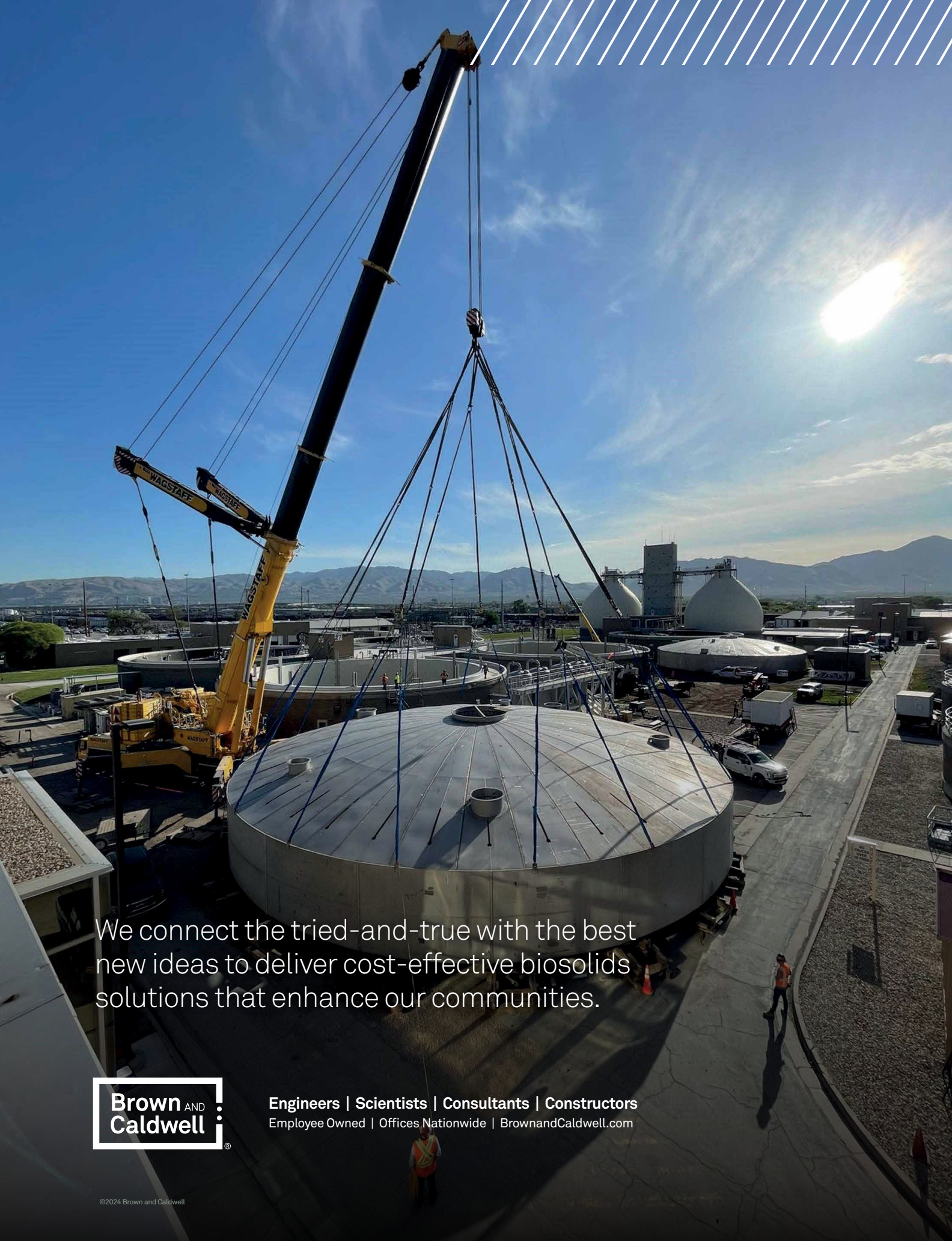
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Chad Burrell

# Reaching the Rising Generation

I recently sent a letter, on behalf of WEAU, to the local high school where my kids attend. The subject of the letter was to inform their leadership of the many opportunities for jobs, education, and careers in the wastewater industry. The WEAU Board helped me write a draft of the letter.

I felt there was a great need to reach out to the rising generation to both educate them and possibly involve them with what our industry

is trying to build, which, in the words of WEF is: "A Life Free of Water Challenges." I have included a copy of this letter in this issue of *Digested News* in hopes of spreading the word. WEAU as well as our industry, have a lot to offer, and not just to our membership, but to each of the communities we live in. Feel free to share our ideas with those you associate with and if there is any way we can further our education and involvement in water we are happy to do it.

WEAU took a special trip to present the WEF Lab Analyst Excellence Award in person to Shellie Turnbow, Laboratory Director at Provo City. Thank you, Shellie, for being a great director, leader, and mentor to all those around you.



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July 23, 2024

In today's world, water is an invaluable resource that plays a critical role in our daily lives. However, the rising generation may not fully grasp the significance of water management and the diverse, rewarding career opportunities available in the water industry. In Utah, there is an urgent need for dedicated individuals to join the workforce in roles that protect human health and the environment by safeguarding our water resources.


As parents, educators, and community leaders, it is our responsibility to prepare and inform our youth about these vital career paths. The Water Environment Association of Utah (WEAU) is a nonprofit volunteer organization committed to supporting, training, and educating individuals interested in the water resource and recovery industry within our state. WEAU operates as a Member Association to the Water Environment Federation which is an international organization.

We would be thrilled to collaborate with your school to educate your students and staff about Utah's water needs and the array of career opportunities in this field. We invite you to engage with us to explore how we can assist in this endeavor. Here are some of the ways we can contribute:

- **Career Counselor Engagement** – We can meet with your career counselors to inform them about the various career paths in the water industry, emphasizing roles that do not require a college degree.
- **Job Fair Participation** – We can set up a booth at your school's job fair, highlighting job opportunities and the steps to becoming a certified wastewater treatment operator.
- **Classroom Discussions** – We offer engaging in-class discussions on topics such as the history of water and water regulations, the science and biology of water treatment, and the wastewater treatment process itself.
- **Scholarship Information** – We can provide details about scholarship opportunities and prestigious awards like the Stockholm Junior Water Prize.
- **Training Certificates and Classes:** The WEAU offers a wide range of in person training classes throughout the year as well as online courses through the American Water College (AWC). Signing up for these online courses through WEAU is not only extremely inexpensive (\$275/year), but it offers students basic and advanced training to prepare them for a career in the water industry.

We believe that by working together, we can inspire and prepare the next generation to pursue fulfilling careers in the water treatment industry, contributing to the well-being of our communities and environment.

Please feel free to reach out to me for further information or to arrange a meeting with your leadership team. I look forward to the opportunity to discuss how we can support your efforts in guiding students towards these valuable and well-paying career opportunities.

Chad Burrell  
President of WEAU 



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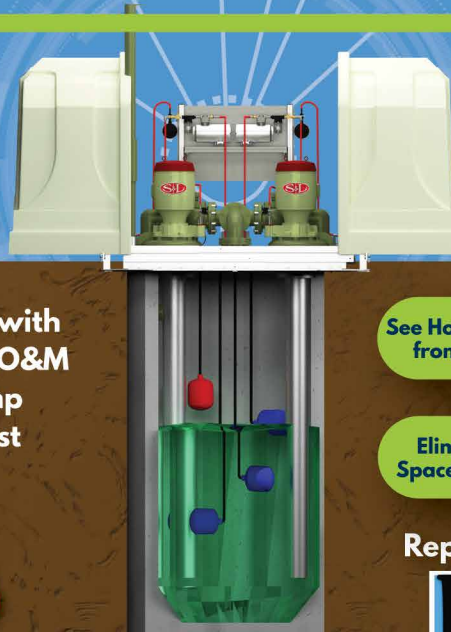


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# Under the Influents

Bryan Mansell

**R**ecently, at Central Valley, we found we had a trunkline that needed some significant cleaning. The low velocity in this pipe had led to gradual accumulation of grit and detritus along the bottom, decreasing its capacity, and even making inspection problematic. A substantial amount of water, power, and time are required to clean it out and restore it to full capacity. Many who read this will find this all too familiar. After all, cleaning of sewer pipelines is a major part of our industry. One could make the case that it's the most critical part, since it allows the sewage to effectively flow away from homes and industry and reach points of treatment. Without this effort to maintain conveyance, our efforts to treat and reclaim the water would be futile. But the conveyance itself is also self-defeating since it's what carries the grit and debris that tend to settle in the pipes and reduce capacity.

While there are many parallels that could be drawn with this, my mind can't help but think of our current political climate and the widespread buildup of opinions, polls, debates, and daily news cycle filling our minds regarding the impending election. This is basically part of the political process but can become imbalanced. Further, it seems there's an army of illicit dischargers intent on clogging the pipe of public information full of misinformation and crowd-pleasing slander so that truth, reason, and genuine goodwill become substantially impeded. Indeed, the mudslinging and slimy tactics being employed by politicians of all persuasions resembles the muck filling up our pipes and our vac trucks.

Still, as practitioners of conveyance and treatment, we don't have to get stuck knee deep in the nastiness and be mired under the influents. Like the cleaning of an essential conveyance system,



we all could work at performing a brisk flushing and cleaning of our political opinions and principles to remove the gradual accumulation of any unfounded prejudices, sophomoric attitudes, mob mentalities, and ill-will towards an opposing political party, person, or group of people. That is not to say we should abandon our points of view or our beliefs and principles. It's imperative to the political process that we vote our conscience or stand up for what we believe is right, but it's equally critical that we try to be as fully informed as possible by maintaining an open channel of understanding and an unhindered interest in others' perspectives. As we do, we will find a lot of common ground and realize once again that other points of view help us refine and better understand our own. Doing so is one of the great privileges of living in a democracy. [DNI](#)

## FIND THE HIDDEN GOLDEN SLUDGE SHOVEL!\*

Each quarter, *Digested News* has this golden sludge shovel icon hidden somewhere in the content of its pages.

**Be the first to find it and email the editor** ([digestednews@weau.org](mailto:digestednews@weau.org)) the correct page number to **win a \$25 Amazon Gift Card.**

Emails should include:

- Subject: I found the golden shovel
- Correct page number
- Your name and work address

Winners will be notified directly and named in the next issue of *Digested News*.

\*For those of you new to WEAU, volunteers who give notable time and service to WEAU are awarded a "5S" golden lapel pin shovel. With that award, they become members of the **Select Society of Sanitary Sludge Shovelers**. WEAU is always looking for volunteers and maybe one day, you too can become a 5S member. [DNI](#)



**CONGRATS TO:**  
**CLAY MARRIOT OF CENTRAL**  
**WEBER SEWER IMPROVEMENT**  
**DISTRICT FOR FINDING THE**  
**GOLDEN SHOVEL ON PAGE 17 OF**  
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**ENJOY YOUR GIFT CARD!**

**Have feedback or suggestions?** We'd love to hear from you about what parts of *Digested News* you find helpful, or about what you'd like to see. Email us at [digestednews@weau.org](mailto:digestednews@weau.org).

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# Collections Quiz

Submitted by Daniel M. Olson

1. **A pump is delivering less than the expected rate of discharge. What can cause this to happen?**
  - A. Discharge head too low
  - B. Discharge head too high
  - C. Check valve open
  - D. Pump is primed
2. **A map with a scale of 0.875 in=100 ft indicates that manhole A is 11.20 in from manhole B. What is the actual distance between manholes?**
  - A. 980.0'
  - B. 781.3'
  - C. 1,280.0'
  - D. 2,343.8'
3. **If a repair job can be done by seven people in 8.5 hours, how long will it take for four people to do a similar job?**
  - A. 4 hours and 30 minutes
  - B. 14 hours and 9 minutes
  - C. 4 hours and 51 minutes
  - D. 14 hours and 53 minutes
4. **In sewer maintenance, what is a pig?**
  - A. A bullet shaped object passed through a force main
  - B. A power rod
  - C. Any foul-smelling equipment
  - D. The hydraulic rodding truck
5. **A crew surveys a sewer from STA. 11+3.00 to STA 23+58.35. If the elevation of the manhole (farthest to the treatment plant) is 665.3 ft, what is the elevation of the second manhole if the grade is 0.0011 FT/FT?**
  - A. 1.4'
  - B. 663.9'
  - C. 666.7'
  - D. 6.6'
6. **Mechanical ventilation of a lift station is required to \_\_\_\_\_.**
  - A. Ensure safe working access
  - B. Reducing chlorine demand
  - C. Reduce corrosion
  - D. Increase dissolved oxygen (DO) in raw wastewater
7. **If a pump outputs 625 GPM against a total dynamic head of 211 ft, and the pump is 71% efficient, what is the brake HP if the fluid being pumped has a specific gravity of 1.12?**
  - A. 26.5 HP
  - B. 32.3 HP
  - C. 4.2 HP
  - D. 41.8 HP
8. **A sewer jet with a 1475-gallon tank has an 80 gpm pump. If the operator has to fill the truck five times in an eight-hour day, how much time is spent actually cleaning sewers during that day?**
  - A. 11 hours and 31 minutes
  - B. 3 hours and 50 minutes
  - C. 1 hours and 32 minutes
  - D. 2 hours and 28 minutes
9. **The following flows were recorded for the months listed below. What was the average daily flow for this three-month period?**

**February = 197.3 cfs**  
**March = 100,186.2 gpm**  
**April = 255.7 MGD**

  - A. 5.9 MGD
  - B. 527.2 MGD
  - C. 127.3 MGD
  - D. 4.7 MGD
10. **A contractor is building a house with a basement elevation of 884.6 ft. The stub-out connection elevation is 876.5 ft. If the minimum allowable slope is 3/8 in/ft, how far from the road can the builder place the house?**
  - A. 246.5 ft
  - B. 259.2 ft
  - C. 331.7 ft
  - D. 27.4 ft
11. **A common name appurtenance used to keep an accidental flow of wastewater from entering a building is called \_\_\_\_\_.**
  - A. Barrel
  - B. Cleanout
  - C. Backwater valve
  - D. Catch basin
12. **A degreasing agent is added to a 11.5 ft diameter wet well that is 9.5 ft deep. 4.5 lbs is required for every 1 ft<sup>2</sup> of surface area. If the degreaser weighs 3.5 lbs per gallon and has a concentration of 16.4 mg/l, how many lbs of chemical must be added to the well?**
  - A. 4,438.1 lbs
  - B. 0.48 lbs
  - C. 3,494.5 lbs
  - D. 467.2 lbs
13. **The most important traffic safety consideration is the \_\_\_\_\_.**
  - A. Time of day
  - B. Size of the job
  - C. Wearing of hard hats and safety vests
  - D. Location of the job
14. **Which of these chemicals may be used for odor control in sewers?**
  - A. Chlorine
  - B. Muriatic acid
  - C. Potassium chloride
  - D. Sodium chloride
15. **A four-cylinder positive displacement pump has a cylinder bore of 4.5 in with a stroke of 5.5 in. The pump operates at 1,700 RPMs. How long will it take to empty a 72-in diameter wet well, 33.0 ft deep, if it has an inflow of 2,500 gpm?**
  - A. 1 hour 44 min
  - B. 0 hour 3 min
  - C. 1 hour 87 min
  - D. 1 hour 0 min
16. **Sources of excessively clear water in a collection system include \_\_\_\_\_.**
  - A. A problem at the wastewater treatment plant
  - B. A sanitary sewer leak
  - C. Exfiltration from a high-water table
  - D. Infiltration from a high-water table

17. Given the following information, would it be less expensive to finish the job in two days, or finish the job in one day by working overtime?

*Actual job time = 13.00 hours  
Travel time and set-up time = 1.25 hours  
Average Workday = 8.00 hours  
Hourly pay rate = \$21.25  
Overtime is 1.50 times the normal hourly rate*

- A. Cheaper to do the work with OT
- B. Cheaper to do the work in two days
- C. Costs the same either way
- D. None of the above

18. A 11-ft wide x 2,650-ft long trench must be excavated, and the spoils removed from the premises. The spoil weighs 3,600 lbs/cuyd and each truck can carry 11 tons. How many truck loads are required if the trench is 14.0 ft deep?

- A. 4,946 Trucks
- B. 2,474 Trucks
- C. 7,420 Trucks
- D. 2,473 Trucks

19. Grease in sewers is mechanically removed by \_\_\_\_\_.

- A. High-pressure jets
- B. Sawing
- C. Not usually a problem in sewers
- D. Power rodders

20. A kilowatt (KW) is equivalent to \_\_\_\_\_.

- A. 0.67 amperes at a voltage of 120
- B. 746 watts
- C. 1.34 horsepower
- D. 1,000 megacycles

21. If the grade of a sanitary sewer has a slope of 0.10% for 1,200 ft, what is the rise of the pipe?

- A. 1201.2 ft
- B. 1.20 ft
- C. 0.01 ft
- D. 0.12 ft

22. Convert 425° Fahrenheit to Celsius.

- A. 457°C
- B. 797°C
- C. 218°C
- D. 236°C

23. 31 mg/l of chemical was previously used to treat a flow of 7,525,000 gal/day. The chemical cost is \$1.37/lb. A chlorine residual test determined that 17 mg/l of chemical would be satisfactory. How much money would be saved per month by using the 17 mg/l dose instead of the 31 mg/l dose? (1 month = 30 days)

- A. \$32,387.54
- B. \$36,111.24
- C. \$79,960.60
- D. \$43,849.36

24. Infiltration my result from \_\_\_\_\_.

- A. Bad joints
- B. Improper closed circuit television operation
- C. Poor ventilation
- D. Direct downspout and drain connections

25. Which one of the following is a property of chlorine gas?

- A. Heavier than air
- B. Harmless to humans
- C. Highly flammable
- D. Lighter than air **DN**

**Answers**

20-C, 21-B, 22-C, 23-B, 24-A, 25-A, 14-A, 15-A, 16-D, 17-B, 18-B, 19-A, 8-C, 9-A, 10-B, 11-C, 12-D, 13-C, 1-B, 2-C, 3-D, 4-A, 5-B, 6-A, 7-D,





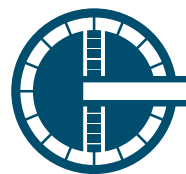
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# Maintenance Quiz

1. **When rigging a piece of equipment that requires a sling. What type of sling gives the highest safe load rating?**
  - a) Choker
  - b) U-sling
  - c) 60-degree
  - d) 45-degree
2. **A pump needs to be repacked when \_\_\_\_\_.**
  - a) No more packing will fit into the stuffing box
  - b) There is excessive leakage from the packing
  - c) The packing is more than one year old
  - d) The packing gland is pulled all the way down and there is excessive leakage
3. **The type of gear referred to as the basic gear, which has straight teeth that are parallel to the bore centerline, is called \_\_\_\_\_.**
  - a) A bevel gear
  - b) A single helical gear
  - c) Herringbone gear
  - d) A spur gear
4. **A circuit has 120 volts applied across and resistance of 6 ohms. What is the current?**
  - a) 20 amps
  - b) 50 watts
  - c) 75 watts
  - d) 720 amps
5. **What is the purpose of the cage in an antifriction bearing?**
  - a) Keep the grease next to the rolling elements
  - b) Hold the rolling elements in the race during assembly
  - c) Hold the rolling elements in the race during operation
  - d) Properly space the rolling elements and guide them through the load zone
6. **When aligning a piece of equipment, it is best to \_\_\_\_.**
  - a) Complete the horizontal part of the alignment first
  - b) Complete the vertical part of the alignment first
  - c) Do both the horizontal and vertical at the same time
  - d) Align the driven to the driver
7. **Backlash on a gear is defined as \_\_\_\_\_.**
  - a) The wear on the backside of the gear tooth
  - b) The difference in RPM between two mating gears
  - c) Another name for gear mesh frequency
  - d) The play between gears that prevent binding
8. **Using a counterweight scale, you are required to use six disks to offset the weight of an object. If the disks are 10 inches in diameter, 1-inch thick, and made of steel that weighs 725 pounds per cubic foot, what is the weight of the object?**
  - a) 197.5
  - b) 272.5
  - c) 395.2
  - d) 725
9. **The main function of a lantern ring in a centrifugal pump is to \_\_\_\_\_.**
  - a) Apply sealing fluid to the stuffing box
  - b) Keep the packing straight and level
  - c) Provide cooling and lubrication
  - d) Properly align the packing in the stuffing box
10. **Preheated loads and vibrations applied over long period will cause \_\_\_\_\_.**
  - a) Metal strain
  - b) Metal breakdown
  - c) Metal fatigue
  - d) Elastic breakdown
11. **A 30-tooth gear is attached to a pump that needs to operate at 500 RPM. If the motor operates at 750 RPM, how many teeth does its gear need?**
  - a) 12
  - b) 20
  - c) 42
  - d) 45
12. **What does the term “braided” refer to when applied to a pressure hose or fuel line?**
  - a) Type of inner hose reinforcement
  - b) Type of material used for fluid contact
  - c) Method of connecting hose sections
  - d) Hose covering material
13. **All special-wire terminals \_\_\_\_\_.**
  - a) Must have matching receptacles
  - b) Are non-insulated
  - c) Require butt connectors
  - d) Are pre-marked for identification
14. **Which of the following is optional in a single variable control loop?**
  - a) Controller
  - b) Final control element
  - c) Recorder
  - d) Transducer
15. **The first step in troubleshooting a programmable logic controller system is \_\_\_\_\_.**
  - a) Gathering information
  - b) Understanding how the system works
  - c) Developing a test strategy
  - d) Replacing any suspicious components 

## Answers

1-B, 2-C, 3-D, 4-A, 5-D, 6-B, 7-D, 8-A, 9-A, 10-D, 11-B, 12-A, 13-A, 14-C, 15-B.



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# Operations Quiz

1. **100 feet of pressure is how many psi?**  
 A. 2.31 psi  
 B. 0.433 psi  
 C. 23.1 psi  
 D. 43.3 psi
2. **The measured alkalinity is 2410 mg/l. If the volatile acids concentration of the sludge in an anaerobic digester is 144 mg/l, what is the va/alkalinity ratio?**  
 A. 0.09  
 B. 0.06  
 C. 0.17  
 D. 0.03
3. **A substance that participates in a chemical reaction, but is not used up by that reaction is a \_\_\_\_\_.**  
 A. Catalyst  
 B. Inhibitor  
 C. Reactant  
 D. Product
4. **Which filament is most likely to cause foaming in the fall?**  
 A. Microthrix Parvicella  
 B. Nocardia  
 C. Nostocoida Limicola  
 D. Sphaerotilus Natans
5. **A round shaped bacteria is known as \_\_\_\_\_.**  
 A. Bacillus  
 B. Coccus  
 C. Eukaryotic  
 D. Prokaryotic
6. **In a biological nutrient removal system in which phosphorus removal has declined, it's appropriate to test mixed liquor in the anaerobic zone for the presence of \_\_\_\_\_.**  
 A. Nitrate  
 B. Nitrite  
 C. pH  
 D. Ammonia
7. **A pump uses 15 watts to produce 15 HP. What is the pump efficiency?**  
 A. 50%  
 B. 100%  
 C. 75%  
 D. 70%
8. **Which chemical would help neutralize a sour digester?**  
 A. Sodium Hydroxide  
 B. Ferric Sulfate  
 C. Chlorine  
 D. Polymer
9. **Controlling \_\_\_\_\_ in a pond can be accomplished by disturbing the water surface.**  
 A. Mosquitoes  
 B. Midges  
 C. Tadpoles  
 D. Dragonflies
10. **Another name for a wastewater treatment pond used to treat raw wastewater is \_\_\_\_\_.**  
 A. Digestive pond  
 B. Oxidation ditch  
 C. Facultative pond  
 D. Waste stabilization pond
11. **What must be considered when designing a no-discharge pond system?**  
 A. Sewer rates  
 B. Electricity rates  
 C. Percolation and evaporation rates  
 D. Precipitation rates
12. **Most of the "work" is performed by the \_\_\_\_\_ in an activated sludge treatment plant.**  
 A. Bacteria  
 B. Ciliates  
 C. Protozoa  
 D. Rotifers
13. **Surface foaming in an aeration basin can be controlled by \_\_\_\_\_.**  
 A. Increasing the aeration rate  
 B. Increasing solids wasting  
 C. Surface water sprayers  
 D. Increasing the MCRT
14. **If proper DO levels are not maintained in the aeration tank sludge will not settle properly.**  
 A. False  
 B. True
15. **How long will it take for the flow to get to the GSL? -58" diameter pipe -6.3 miles long -20 MGD**  
 A. 3.5 hours  
 B. 4.0 hours  
 C. 5.5 hours  
 D. 6.5 hours Dn

## Answers

1-D, 2-B, 3-A, 4-A, 5-B, 6-B, 7-C, 8-A, 9-A, 10-D, 11-C, 12-A, 13-C, 14-B, 15-C.

# As We Move Forward in the Year

By James Magill

The annual PWO Golf Tournament was held at Thanksgiving Point in early June. The turnout was great, with a total of 15 teams. There was a tie for 1st Place between PCL and Geneva Pipe & Precast, broken with the least strokes on hole 11. PCL placed first, Geneva Pipe & Precast took second place, and third place went to Central Davis Sewer District.

Mid-June, Thatcher provided a plant tour and held a training on Chlorine, Sodium Hypochlorite, and other chemicals taught by Jeff Zidek. We had a great turnout. Thank you to everyone who attended.

In October, we have the Wasatch All-Stars and Central Valley Water Reclamation Facility teams heading to New Orleans to compete against other teams from all over the US and abroad. On the All-Stars team, we have Trevor Creamer from Central Weber, Cory Zeman, and Jonathon Baranowski from South Valley Water, Steve Lamb from Snyderville Basin Water Reclamation Facility, and Shawn Bosen from North Davis Sewer District. From Central Valley Water Reclamation Facility, we have Jay Nowell, Brock Thompson, Tony Rizzuto, Jeff Bullock, and Brady Adams. We wish you all the best of luck!

On a different note, I would like to share a story about a family of ducks that made their



home in a secondary clarifier that had been taken out of service for painting and repairs. A hen mallard built her nest in the bottom of the clarifier, where a small amount of water from the PRVs and some moss provided the essentials for her ducklings to survive.

Unfortunately, before the ducklings could fly, the paint and sandblasting crew arrived to start the rehab work. During our morning meeting, Sean Fischer asked if he could go in and attempt to rescue the mother and her baby ducks. Craig Jensen and I volunteered to help in this mission.

That morning, we moved some equipment around and got everything in place to enter the clarifier. Operations provided long poles with nets big enough



to catch the ducks. It only took a matter of minutes to round up the ducklings, but the mother managed to escape and flew away.

Once we had all the ducklings, they were released into the retention pond behind the maintenance building, which at that time was full and close to the river. Later that night, working on a project, I saw the hen mallard return to her ducklings, I watched as they made their way through the fence and swam away downstream.

This little excursion was a pleasant break from the usual day-to-day activities and gave the ducks a chance to survive. [DIN](#)



# Operator Spotlight: Adam Gillman

By James Magill

This quarter, I would like to introduce Adam Gillman. He has been with Jordan Basin Improvement District for four years; he is currently a Grade 2 Maintenance Mechanic/Electrician and holds a Grade 1 Wastewater Certification. Adam is currently attending Salt Lake Community College, where he has completed three years and will start his fourth year soon.

Adam has been married for 24 years and has two children, a 21-year-old son and an 18-year-old daughter. Before joining Jordan Basin Improvement District, he worked as a Service Electrician since 1997. In his free time, Adam enjoys camping, hunting, and working on various projects

around his home where he resides in Taylorsville, UH.

Looking for a change within his career, Adam was referred by a friend that initially introduced him into the wastewater industry. At Jordan Basin, he serves on the Safety Committee and previously served on the Awards Committee. He really enjoys working with the management staff and his Supervisor, Chris Smith; lead man, B. Thacker; and fabricator, Aaron Plott; as well as Jon Moreno and Brandon Burton. He loves visiting other plants and networking with people within the wastewater industry. His enthusiasm for his future is evident, and he is known for being passionate about his work, outgoing, and easy to get along with.



Adam has a goal to be on an Operations Challenge Team and compete at the WEAU Annual Conference in St. George. [D21](#)



## Gonzalez Receives Operator Scholarship

Congratulations to Colinrae Gonzalez of Central Weber Sewer Improvement District, who is a 2024 recipient of a WEF Operator Scholarship. He will be using the funds to pursue a bachelor's degree at Utah State University.

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# Young Professionals Update

The Young Professionals continued to have fun all summer with monthly events. Check out what the YPs have been up to!

## May

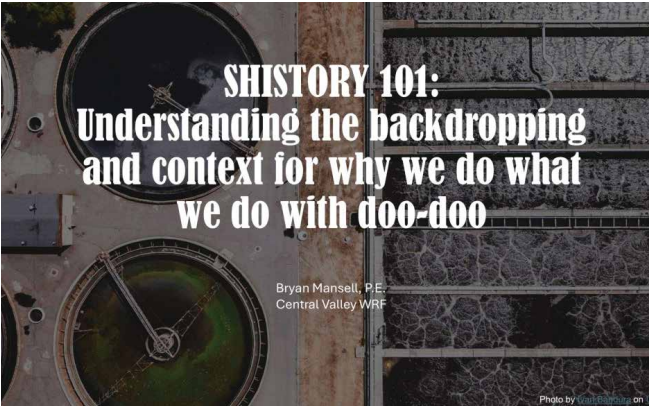


Central Utah Conservancy District Water Treatment Plant Tour.



The YPs hosted the opening night social event at WEFMAX, Park City.

## June



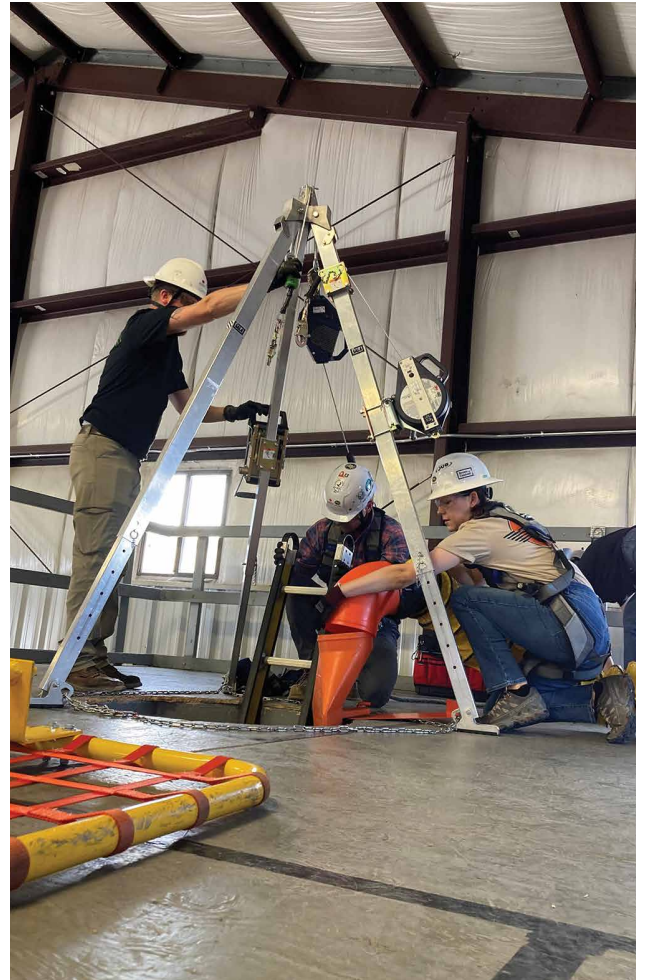
Bryan Mansell, Chief Engineer at CVWRF, shared his presentation 'Shistory 101.'

## July



The YPs met for Pizza and Pickleball at Second Summit Cider Co.

## August



The YPs met at CVWRF to learn more about the Ops Challenge and watch experienced Ops Challenge Teams practice for the national WEFMAX competition. [Dn](#)

# YP Summit – The Future of Water

The Young Professionals are hosting their second annual WEAU YP Summit. Visit [www.wEAU.org](http://www.wEAU.org) for additional information and registration details.



## When

Tuesday, November 5, 2024  
12:00 pm to 5:00 pm  
(day before WEAU Mid-Year Conference)

## Where

Jordan Basin Improvement District  
1253 Jordan Basin Lane,  
Bluffdale, UT 84065

## Registration

Registration is now open!  
\$50 for WEAU Members  
\$75 for Non-Members  
\$10 for Utah Students  
*Limited to 60 attendees*

## Agenda

10:30 am to 11:30 am	Jordan Basin WRF Tour <i>(optional)</i>
11:30 am to 12:30 pm	Registration & Lunch
12:30 pm to 12:45 pm	Icebreaker activity
12:45 pm to 1:45 pm	Module 1: Modern Water Challenges
1:45 pm to 2:45 pm	Module 2: How to Talk to Anyone
2:30 pm to 3:00 pm	Break & Prize Drawing
3:00 pm to 4:00 pm	Module 3: Strategies for Industry Success
4:00 pm to 4:45 pm	Module 4: Furthering the WEF Mission
4:45 pm to 5:00 pm	Closing Remarks
5:30 pm to 7:00 pm	Social Event at Pins & Ales <i>(optional)</i>

## Registration

Registration is now open for YP Summit on [www.wEAU.org](http://www.wEAU.org).

- Registration is limited to 60 attendees so register early to secure your spot at a can't miss YP event!
- Registration will close on October 31 at 11:59 pm or when tickets run out.
- Same day registration will not be available.
- Please indicate at time of RSVP if you plan to attend the optional plant tour or social event. Note that you must be 21+ to attend the social.

Learn more at <https://wEAU.org/meetinginfo.php?id=175&ts=1720562534>. 

*See you November 5, 2024!*





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# 2024 MID-YEAR CONFERENCE PREVIEW

## NOVEMBER 6, 2024

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West Valley City, UT

The Mid-Year Conference is just around the corner, and it's an event you do not want to miss! Whether you are a seasoned expert in your field or only starting your journey, the conference has something valuable to offer for everyone. The conference is packed with informative sessions and engaging discussions on all topics in wastewater. You will leave with actionable takeaways and new connections that will propel your career forward.

## CONTINUING EDUCATION

Are you a certified operator in need of continuing education units? You can earn up to 0.5 CEU by attending the WEAU Midyear Conference. Are you a professional engineer? It is required that you complete a minimum of 30 hours of professional continuing education within a two-year renewal cycle. The time you spend in sessions at the conference counts toward your continuing education requirement.

## TICKETS

	Members	Non-Member/ Guest Registration
<b>Regular Rate</b>	<b>\$135.00</b>	<b>\$220.00</b>
<b>Early-bird Rate (Before October 25)</b>	<b>\$100.00</b>	<b>\$165.00</b>
<b>Delayed Registration Rate (After 12:01 am on November 2)</b>	<b>\$220.00</b>	-
<b>Student Rate</b>	<b>\$0.00</b>	<b>\$0.00</b>

## REGISTRATION

- Early bird registration available October 1
- Same-day registration will be available in-person at registration desk.

Register at [www.weau.org](http://www.weau.org).

## MARK YOUR CALENDARS

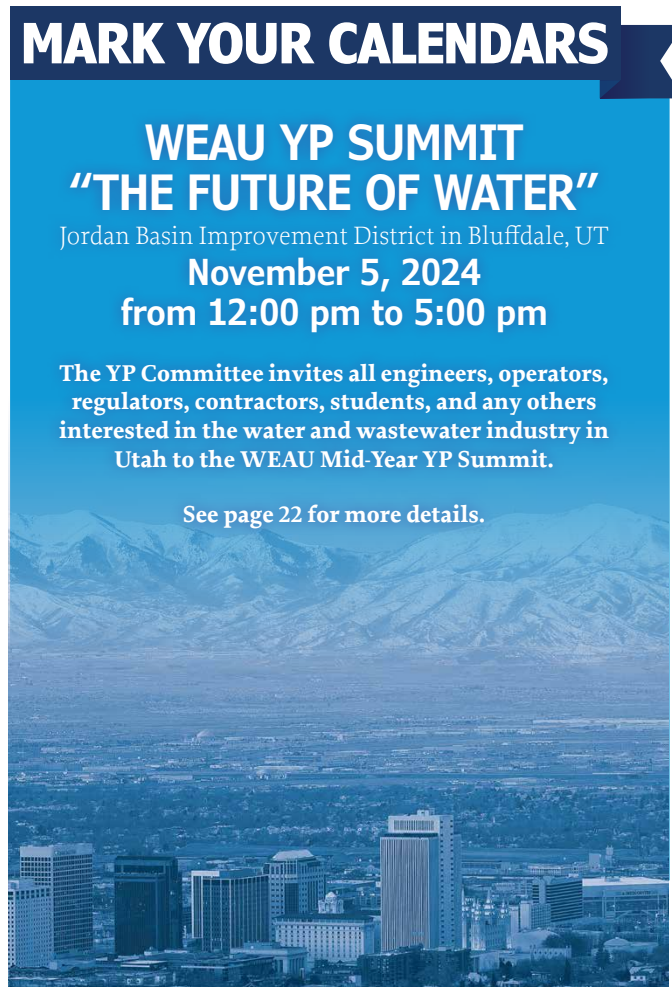
### WEAU YP SUMMIT "THE FUTURE OF WATER"

Jordan Basin Improvement District in Bluffdale, UT

**November 5, 2024**  
**from 12:00 pm to 5:00 pm**

The YP Committee invites all engineers, operators, regulators, contractors, students, and any others interested in the water and wastewater industry in Utah to the WEAU Mid-Year YP Summit.

See page 22 for more details.



## PRELIMINARY TECHNICAL SESSION LISTING

TIME	PLAZA BALLROOM A	PLAZA BALLROOM B	PLAZA BALLROOM C	SUITE C
8:00-8:30	REGISTRATION AND CONTINENTAL BREAKFAST			
TOPIC	COLLECTION SYSTEMS	OPERATIONS	NUTRIENT REMOVAL	PROJECT DELIVERY
8:30-9:10	<b>Burst It or Trench It: SLCDFPU 2100</b>	<b>CVWRF Recent Electrical Challenges and Solutions</b>	<b>Overview and Comparison of Process Intensification Technologies</b>	<b>Unlocking the Maximum Capacity of Bluebeam to Level Up Your QC Process</b>
	Brandon Wyatt, Bowen Collins & Associates	Sharon Burton, CVWRF and Navneet Prasad, CVWRF	Kelsey Wagner, AE2S	Lauren Schmidt, J-U-B Engineers Inc.
TOPIC	COLLECTION SYSTEMS	OPERATIONS	NUTRIENT REMOVAL	PROJECT DELIVERY
9:20-10:00	<b>The BIG Tunnel That Could</b>	<b>How Do You Know Your Data is Reliable?</b>	<b>Standing on a corner in Magna, Utah: A Look at Both Past and Future Chemical Phosphorus Removal Operations</b>	<b>Delivering a Comprehensive Construction Project with Multiple Contracts for Salt Lake City Department of Public Utilities</b>
	Jordan Pugmire, J-U-B Engineers	Sherry Sheffield, CVWRF	Clint Rogers, Stantec	Nicholas Griffith, AECOM
10:00-10:20	BREAK			
TOPIC	COLLECTION SYSTEMS	OPERATIONS	NUTRIENT REMOVAL	PROJECT DELIVERY
10:20-11:00	<b>It Doesn't Have to Stink: Wastewater Odor Control 101</b>	<b>Don't Let H2S Control Break the Bank</b>	<b>Troubleshooting Biological Nutrient Removal</b>	<b>The Life of a Project Through the Eye of the Electrical Contractor</b>
	Brenda Blake, USP Technologies	Sharon Burton, CVWRF and Jedd Powell, Hach	Brian Mitchell, WesTech	Brad Wilding, Skyline Electric Company
TOPIC	COLLECTION SYSTEMS	OPERATIONS	NUTRIENT REMOVAL	PROJECT DELIVERY
11:10-11:50	<b>Does Your Sewer Have a Cold? Using Temperature to Find I/I Sources</b>	<b>A Look Inside the Lab</b>	<b>Sidestream Phosphorus, Year One</b>	<b>Large Diameter HDPE Planning, Install, and Design Considerations</b>
	Andy Lukas, Brown and Caldwell	Tyler Weaver, North Davis Sewer District	Aaron Britton, CVWRF	Declan Brown, PCL Construction
12:00-1:20	LUNCH			
TOPIC	COLLECTION SYSTEMS	SUSTAINABILITY	RESIDUALS & BIOSOLIDS	WASTEWATER FACILITIES
1:30-2:10	<b>Benefits of CCTV in a Collections System</b>	<b>Performing the First Multi-Sensor Fugitive Methane Campaign in the Western Hemisphere</b>	<b>Project Updates for Biosolids Gasification Project: Edmonds Washington and Hershey PA</b>	<b>Primary Filtration at the Cave Creek WRP</b>
	Chad Hardinger, Snyderville Basin Water Reclamation District	Trung Le, Brown and Caldwell	Michael Nicholson, Ecoremedy LLC	John Richardson, Black & Veatch
TOPIC	COLLECTION SYSTEMS	SUSTAINABILITY	RESIDUALS & BIOSOLIDS	WASTEWATER FACILITIES
2:20-3:00	<b>Pinpointing Infiltration and Inflow (I&amp;I) Using High Density Sensor Networks</b>	<b>Realistically Envision a Sustainable Future for your Infrastructure with Envision</b>	<b>Fate of PFAS through Incineration, Pyrolysis, and Drying: Research Based Results</b>	<b>Heating Smarter, Not Harder: Cutting Heating Fuel Demands at Wastewater Treatment Plants</b>
	Eric Petersen, RH Borden	Tess Laffer, AECOM	Lloyd Winchell, Brown and Caldwell	Peter Zemke, Brown and Caldwell
3:00-3:20	BREAK			
TOPIC	ASSET MANAGEMENT	SUSTAINABILITY	TBD	STUDENT PRESENTATION
3:20-4:00	<b>Asset Management, Pay Me Now or Pay Me Later</b>	<b>Resiliency By Design: SLC WRF Case Study</b>	<b>TBD</b>	<b>Student Presentation</b>
	Daniel Olson, Snyderville Basin Water Reclamation District	Grant Davies, AECOM	TBD	TBD

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



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# 2024 WEAU AWARDS NOMINATIONS

Due Friday, December 16, 2024

## CATEGORIES

### OUTSTANDING PLANT/SYSTEM AWARDS

Treatment Plant – Under 5 MGD  
Treatment Plant – Over 5 MGD  
Lagoon – Discharging  
Lagoon – Non-Discharging  
Laboratory  
Collections System – Under 5 MGD  
Collections System – Over 5 MGD

### OUTSTANDING PROGRAM AWARDS


Pretreatment Program  
Biosolids Program  
Safety Program

### OUTSTANDING INDIVIDUAL AWARDS

Treatment Plant Operator – Over 5 MGD  
Treatment Plant Operator – Under 5 MGD  
Collections System Operator – Over 5 MGD  
Collections System Operator – Under 5 MGD  
Supervisor – Under 5 MGD  
Supervisor – Over 5 MGD  
Pretreatment Specialist  
Maintenance Specialist  
Laboratory Technician  
Young Professional  
IT Specialist

## NOMINATE TODAY

Forms are available online at [www.weau.org](http://www.weau.org) or from the WEAU Awards Committee.

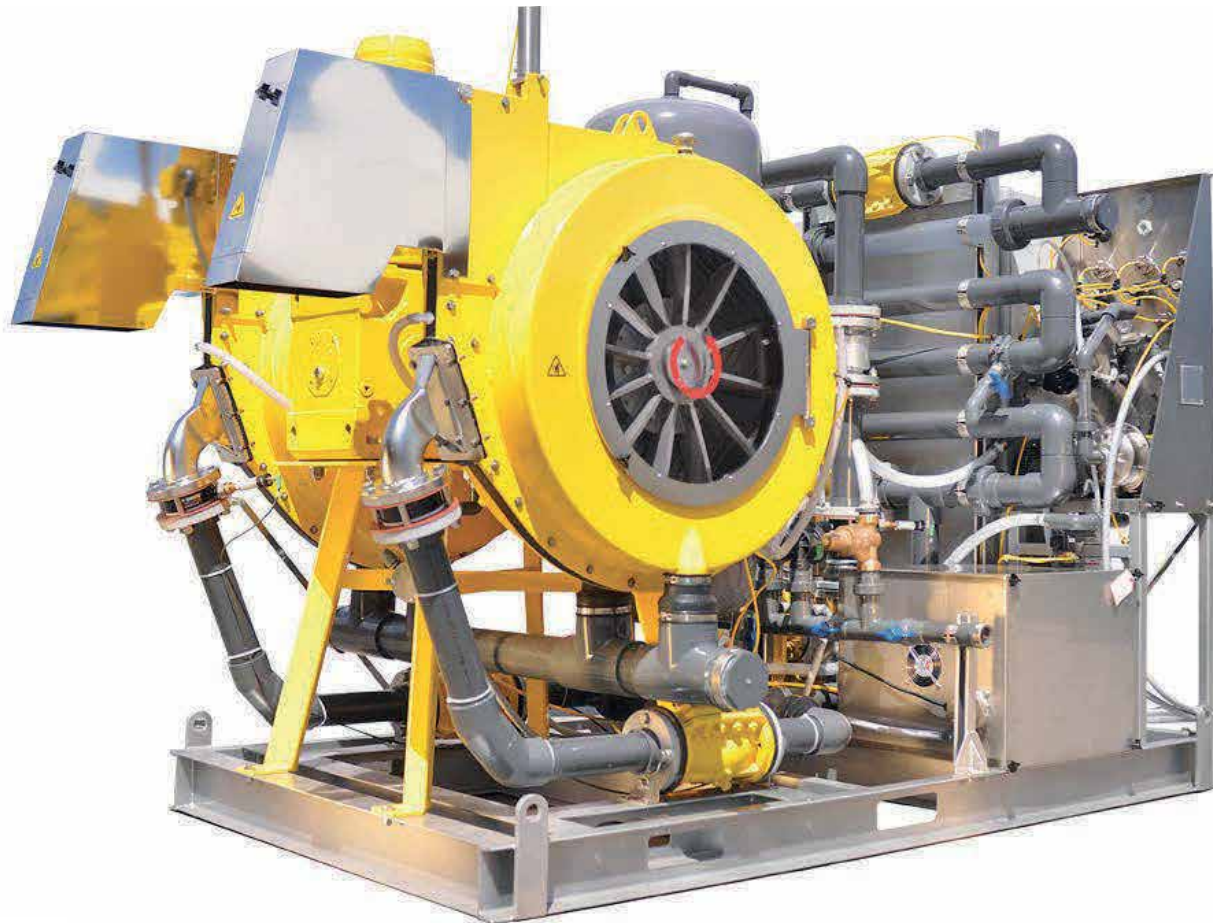
For more information, or to suggest an idea for a special award, contact Spencer Parkinson at 801-244-3901 or by emailing [awardsweau@gmail.com](mailto:awardsweau@gmail.com). Thank you! 



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# Cyber Series Part 1: IT'S NOT JUST ONLINE

By Aimee Matthies

**H**ackers, as portrayed in the media, always look so cool. They sit in a dark room or on a zooming train, typing away on their laptop where lines of code whiz by in green and red text on a black background. The hacker's face is only faintly outlined in shadows as they pull their hood forward on their head to hide their identity.

Strangely, though, it's sometimes easier for hackers or other individuals who are trying to perform nefarious deeds to hide in plain sight. This is especially true when it comes to cracking into computers in offices or surveillance and maintenance computers used in water or wastewater treatment plants. According to a report by the Cybersecurity and Infrastructure Security Agency (CISA), one of the most common ways that hackers who need onsite access to computers get into the workspace is by carrying a toolkit or a ladder, something that makes them look like they belong. In essence, we have been trained not to think too much about those who are doing jobs in plain sight. This is the perfect cover.

How often have you seen someone you don't know who has a shirt with a logo on it and you brush off their presence as normal? Someone else knows about them, surely, you think to yourself. Have you been trained to stop and offer assistance to anyone who doesn't have a member of your staff with them? Perhaps you are supposed to be double-checking that they are signed in correctly (if applicable) or that they don't need help finding the right office. Then, if you've checked with them, if anything seems off about the situation, you can do

something. Maybe they said that Randy from Operations said to meet in the control room, but you happen to know that Randy isn't on shift today. That is an excellent time to take action based on your training. Should you escort them to someone like the general manager? Perhaps make a call on the radio with a predetermined code? Or at the very least, let your manager know that something seems amiss.

This is where an action response plan comes in handy. Each plant should have a plan on what to do if they find unsavory

characters on the grounds or in the buildings. If your plant doesn't have something, you can talk with your team to determine how to get one set up. It is important to be able to take preventative steps to keeping your plant secure.

Remember, if you don't act, who will? Over the next several issues of Digested News, I will be tackling some cybersecurity issues that can be either vulnerabilities for attack or areas that can be shored up with just minor effort on our parts. So, let's all work together to keep our waterways safe. **DN**



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# A Genetic-Based STUDY OF Harmful TOXIC CYANOBACTERIA in Freshwater Lakes



By Krishnam Goel;  
Stockholm Junior National Runner-Up



**H**armful Algal Blooms (HABs), also known as toxic cyanobacteria, are a global problem. The list of microalgal species that are considered HABs contains about 80 toxic species and nearly 200 harmful species out of approximately 4000 marine planktonic microalgae. These toxic genera of cyanobacteria have caused significant water quality issues worldwide, ranging from the Great Lakes in the Northeast US, bodies of water in New Zealand, and at home in Utah. For example, HABs off the Florida coast caused more than 2.5 billion dollars of economic damage last year. Hundreds of sea lions were also found dead off the LA coast in 2023 due to the cyanotoxins produced by these cyanobacteria. Closer to home, in 2020, a dog died at Zions National Park due to contact with benthic cyanobacteria in the waters of the Virgin River. Also, the presence of cyanotoxins and odor in drinking water sources has caused freshwater drinking supplies to dwindle and lead to extremely high treatment costs.

Due to the extent, frequency, and magnitude, of HAB events in the past 30 years, monitoring of these Harmful Algal Blooms has increased worldwide. Several research studies have found that nutrient enrichment could be the most important factor in cyanobacterial growth. Recent research has found that these blooms can occur in very nutrient-scarce environments. Recently, lake nutrient distribution has been changed by a shift of stoichiometry resulting in algal nutrient limitation. Despite this, cyanobacterial growth has still been able to occur, directly contradicting the Red Field Ratio (1934) which describes the minimum ratio of nutrients needed for bloom growth to be 106:16:1 of carbon, nitrogen, and phosphorous. More importantly, the mechanisms by which these cyanobacteria were able to grow are not fully understood by scientists.

Cyanobacteria that are being studied in the Great Lakes and all over Utah are growing in these below-detection-limit nutrient environments. Specifically in Utah waterbodies, toxic cyanobacteria genera such as Planktothrix, Dolichospermum, and Cylindrospermopsis were found to be consistently growing in low-nutrient environments, causing water quality concerns. These toxic genera are known to produce toxins such as anatoxin, also called Very Fast Death Factor (VFDF) and a dangerous neurotoxin, and microcystin (a liver toxin) which are known to cause health issues in both humans and animals. Analysis of the Virgin River in the Zions National Park also showed the presence of the toxic genera Microcoleus which is a toxin-producing benthic cyanobacteria that is thought to be the cause of the death of



a visiting dog in 2020. These benthic cyanobacteria were also seen growing in extremely phosphorus-limited conditions.

The question remains, how are these cyanobacteria able to grow in these “impossible” conditions? Research, using metagenomics and gene expression, has shown that these cyanobacteria have genes associated with the production of harmful cyanotoxins and the presence of both phosphorous scavenging and nitrogen-regulation genes which means that cyanobacteria living in nutrient-deficient conditions have specialized genes that allow them to survive in stressed environments. Specifically, the limitation of nitrogen in water ecosystems is curbed by nitrogen fixation by cyanobacteria. This fixation is the process of atmospheric nitrogen gas (N<sub>2</sub>) into the form of nitrogen that plants and cyanobacteria can use, or in this case, ammonia (NH<sub>3</sub>). Cyanobacteria genomes of cyanobacteria growing in Utah waterbodies have been found to express the genes for nitrogen fixation along with global nitrogen regulatory genes. These genes regulate the nitrogen metabolisms in cyanobacteria, whilst also working with nitrogen fixation genes creating an effective defense against nitrogen-deficient environments.

On the other hand, to combat phosphorous-limited environments, cyanobacteria possess genes that produce proteins for the phosphate-specific transport system (Pst) which is a gene cluster that is important for phosphorous internalization and regulation. Perhaps more importantly, in nutrient-stressed conditions, the cyanobacteria were found to possess the genes *spoT* and *relA* which produce

**“ With more information on how these cyanobacteria can grow, the possibility for future treatment is also increased. ”**

molecules such as guanosine pentaphosphate (ppGpp(p)) which acts as a bacteria “alarm,” alerting the cell’s metabolism to conserve resources and reduce production of ribosomal and transfer RNAs, thus conserving amino acids. Even more interesting is the ability of some types of cyanobacteria to produce alkaline phosphatase enzymes, which can convert organic phosphorous (such as from dead cells or plants in the water) into inorganic phosphorous, thus being able to bypass phosphorous limitations.

Due to Utah’s geographical location and the presence of several waterbodies, significant research is being done into the mechanisms by which these cyanobacteria survive in nutrient-limited conditions. With more information on how these cyanobacteria can grow, the possibility for future treatment is also increased, which will be very important for the future global health of our freshwater and water quality, along with avoiding future damage to people and animals. [DN](#)



# ~ HARD WORK, RESPONSIBILITY ~ AND BRINGING HOME THE BACON

By Chad Hardinger



“Dad, can I do show pigs?” This is how it all started. During my almost-11 years here at Snyderville Basin Water Reclamation District (SBWRD), we have hired several new employees. Finding good applicants that are prepared for the world seems to get harder all the time. The question “will we get good quality applicants?” is on everybody’s mind. We have been very lucky at SBWRD and have hired great employees with good work ethics.

As a parent, I wonder if I am doing enough to prepare my kids for their future and to have a good work ethic. We all grew up with our own set of challenges we had to overcome, but I think the world my kids are growing up in now is going to be far more difficult. The challenge of preparing them to know the value of hard work and being dependable in the work force is something that has always been very important to me.

My 13-year-old daughter had a few friends that do the junior livestock show every year. She has always been an animal lover so I wasn’t surprised when she asked the question: “Dad, can I do show pigs?”

I started doing my research. I am lucky enough to have a few amazing coworkers that are involved in the junior livestock world. I asked a lot of questions and the feedback I got was that it is a lot of work for the kids and parents but can be very rewarding. The process of showing fair animals is a very involved process. Kids have to care for and raise an animal to a certain weight and have a certain look. They train their animal to be able to walk, lead, and show for a judge. The process also includes keeping track of all the time and expense of raising and training their animals and being prepared to be judged on their animal in front of a large crowd of people. The kids put together a portfolio of their project showing all of the cost and time and how much money they made or lost. Then, there is the market and sale of their animals. The process is definitely a lot of work but also provides learning experience and gives participants a taste of the real world.

I ended up with two of my kids wanting to show pigs. With the help of my awesome coworkers, we were able to make it happen. Soon, we had four baby pigs that the two kids had to raise and train.

My kids began learning the meaning of responsibility and accountability. In order for their pigs to be prepared for the fair, they had to feed and tend to each animal. This required putting in the


work of training and teaching. They sacrificed a lot of time hanging out with their friends and doing the other things that most other kids were doing. I was impressed with how well they accepted the challenge and how much work they put in with their pigs.

As the fair was getting closer, it was time to market their pigs for the sale. They both made a flyer and handed them out to potential buyers. They had to write a short introduction and summary of their experience and all the work they had invested in raising pigs. I helped by taking them around to local businesses and past buyers at the fair but made them introduce themselves. They had to talk to other adults and do their best to market their fair animal in a way that would get the buyer to remember them and want to buy their pigs. This was an experience that got them way out of their comfort zone and was very intimidating for them. They got through it and did an awesome job.

At the fair my kids both showed two pigs. We ended up with all of them finishing in the top half of their weight class and one of them finishing second place in its class. In showmanship, they were going against participants that had several years of experience under their belt. My kids had prepared all summer long and represented themselves and their pigs very well. They did not look like first-time contenders. It was a proud dad moment.

The day of the sale was full of excitement and a lot of stress. We wondered whether all the time they had spent on their project and marketing their pigs would pay off. They both sold their pigs for great prices, more than we were hoping for. In the end, enough money was made to fund next year's show pig project and start saving for their future.

As a parent, I cannot think of a better way to have taught my kids about the value of hard work, responsibility, and reward than what they learned this past summer. They took on a challenge that was brand new to them and didn't back down at any point. With determination and a lot of patience they exceeded all our expectations that we had for their first year.

Watching my kids grow and mature during this process is something that I will never forget. I cannot say enough how proud I am of them for taking on a challenge like this, putting in so much hard work, and having a great outcome. Putting them in the FFA/4H Junior Livestock Program is one of the best decisions I have made as a parent. We will continue doing show pigs until they are out of school. My hope is that in doing so, my kids will better understand the value of a good work ethic and responsibility and be better prepared for the difficult adult world that is ahead of them. 

**AS A PARENT, I CANNOT THINK OF A BETTER WAY TO HAVE TAUGHT MY KIDS ABOUT THE VALUE OF HARD WORK, RESPONSIBILITY, AND REWARD THAN WHAT THEY LEARNED THIS PAST SUMMER.**



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# FACING UNCERTAINTY: PLANNING FOR A (BIO)SOLID FUTURE

By Sean O'Connell and Josh Donegan

If it has been some time since your last biosolids master planning efforts, there are several drivers that are worth considering as you reevaluate your vision of the future. Utah, not unlike other parts of the country, is facing significant forces which may radically change biosolids management. The elephants in the room are per- and polyfluoroalkyl substances (PFAS) evidenced by significant legislation on the topic in Maine and Connecticut starting in 2021. These may be warning signs of other efforts to ban beneficial use of biosolids for fears of PFAS accumulation in land and water. Similarly in 2023, we are beginning to see legislation from the EPA curtailing fugitive methane emissions from valves, flanges, and seals at oil and natural gas operations, which could extend to digesters and other treatment operations.

Utah has its own unique conditions that will likely play into plans and significant decisions that utilities should be considering. One driver includes potential reduction in available sites for land application in the next 5 to 10 years. Beneficial use of treated solids and biogas are indelibly tied to opportunities for renewable energy which could help utilities advance broader efforts such as those laid out in Salt Lake City's Climate Positive 2040 plan, which sets goals to have 50% renewables for municipal electricity by 2020, 100% renewable energy for community electricity by 2032, and an 80% reduction in greenhouse gas (GHG) emissions by 2040. Utilities will play an important role in realizing these goals.

Biosolids master plans (BMP) today are not unlike those BMPs we have done previously, that consider factors like existing facility evaluations (condition, capacity, etc.), end-use market evaluations, population and flows/loads forecasts, treatment and process alternatives evaluations, and setting capital budgets for an appropriate planning horizon.

There are several key factors that go beyond those conventional elements, as highlighted in this article. Primarily, the use of decision science and risk-based scenario planning are becoming prominent in Master planning and are quintessential to providing flexibility, mitigating risk, and increasing operational resiliency. Also, robust biosolids management truly is the nexus in wastewater treatment with opportunities to improve energy efficiencies, increased stewardship, and more fully participating in a waste not, want not paradigm.



# FACING UNCERTAINTY:

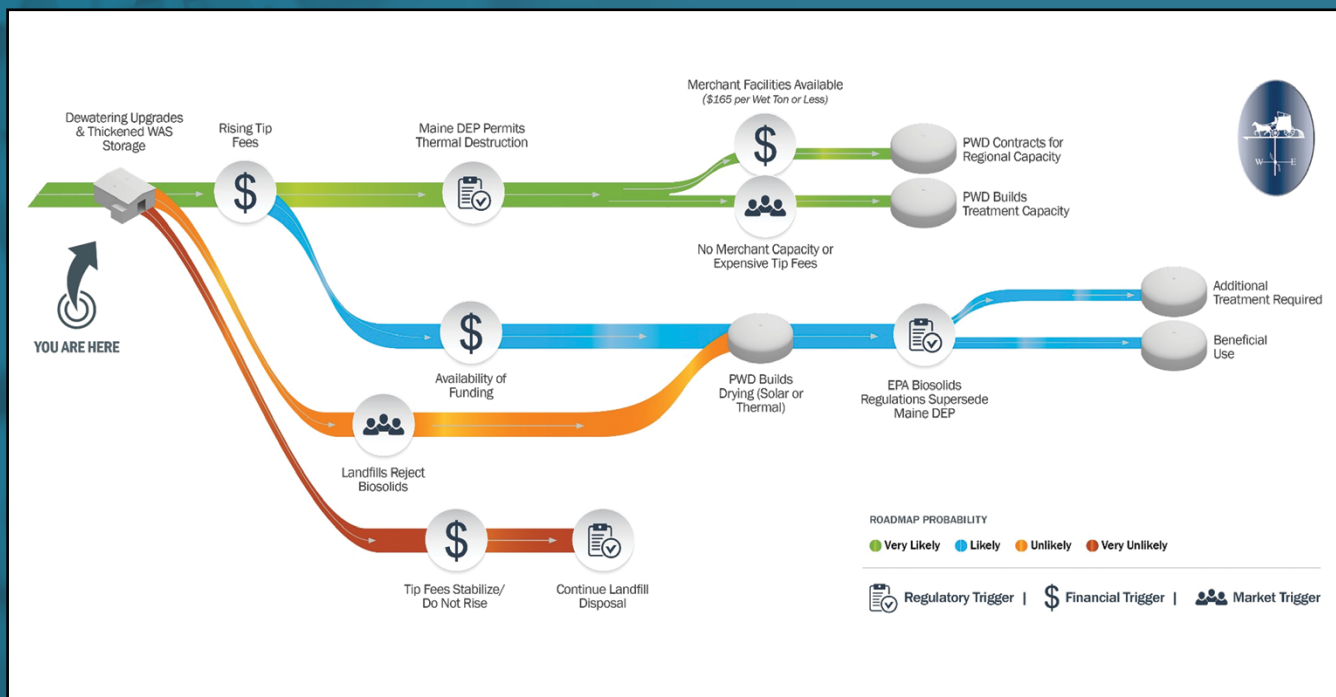


Figure 1

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## Scenario Planning

Master planning inherently must deal with uncertain futures. Uncertainty can come in many forms. While it's impossible to fully predict what regulations might look like or what new treatment processes might develop over the course of a master planning horizon period of 20 years, it is important to begin with the end in mind. The earliest stage of a BMP should consider the known futures, the anticipated futures, and should embrace aspirational possibilities of your organization to set those as targets for developing tactical action plans should an anticipated and planned-for event occur (aka a trigger). Possible triggers can be a regulatory event, a changing market condition (i.e. land-application site closing), end even financial thresholds occur such as a maximum acceptable total cost per dry ton of treatment or even a tipping fee upper limit. These scenarios should also be characterized, as best as possible, to their likelihood of occurrence so that action planning can be tailored, accordingly, in your decision prioritization processes.

Figure 1 shows an example from Maine of what a scenario related to dewatering and thickening WAS storage might look like. Colors represent the categorized probability of each scenario, and the silver buttons can indicate the nature of the trigger anticipated. The ultimate outcome of each scenario is shown as the endpoint of the possible path. These types of representations can help summarize visually the most critical trigger points to consider, and what likely action may result. This synopsis helps inform decision science by allowing stakeholders to understand many possible futures at a glance.

# PLANNING FOR A (BIO)SOLID FUTURE

## Decision Science

Making decisions in a BMP that are lasting, flexible, transparent, and receive buy-in from diverse stakeholders is always a challenge. Decision making support and processes have evolved where the tools can be used to achieve durable and robust plans. While these processes tend to use economic and non-economic factors traditionally used in decision-making, a more robust and defensible plan can be achieved by utilizing advanced alternatives modeling.

Your utility can evaluate relative differences between alternatives that can be calibrated to YOUR existing and proposed treatment processes and future needs. These models can produce calibrated costs of the alternatives on life-cycle cost basis, both capital and operating costs. In addition, it is relatively easy to calculate estimated environmental impact for the alternatives. Taking it a step further, alternatives can then be measured against organization-specific non-cost criteria. What is important to your organization: energy reduction, chemical use reduction, ease of maintenance, safety, community support, etc.?

What is different today from the way those factors have been previously considered is the way in which those criteria are determined and how they are ranked and scored. Today, data-centric evaluation methodologies and tools allow us to gather important factors easily from diverse sets of stakeholders and utilize surveys to better understand what is most important to them. Algorithms then aggregate importance factors and scoring that is applied to each alternative being considered. This results in benefit scorings that represent important, easy to see, relative differences between alternatives. Finally, simple visualization tools can then combine the cost and non-cost benefits scores such that one can easily see how the alternatives' benefits line up with their overall costs.



Figure 2: MCDA Visualization Tool Output

- 1** A visual depiction of how each alternative scored relative to the individual criteria evaluated (each color is a separate criterion).
- 2** Costs for each alternative graphed against the relative benefits scores for each alternative.
- 3** Adjustable criteria weighting factors used for the evaluation and agreed-upon by stakeholder decision makers providing input to the evaluations (comprises the results of item 1).
- 4** Weighting schemes can be adjusted to the stakeholders' interests or can be evaluated equally, providing an opportunity for sensitivity analysis.

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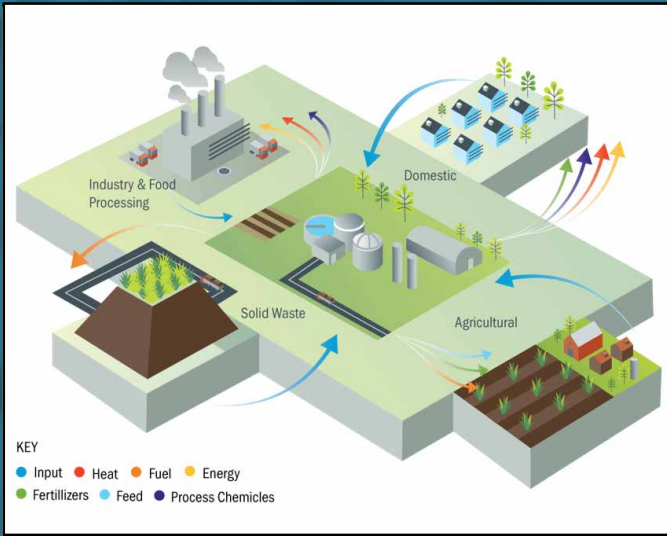


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# FACING UNCERTAINTY:



**Figure 3: A Circular Economy Plan Puts Water Reclamation Facilities at the Center of Stewardship.**

An example of output from this multi-criteria decision analysis (MCDA) tool can be seen in Figure 2. Another powerful capability of these tools is that once the tool is populated it can be manipulated in real-time to test sensitivities to any parameter being evaluated. For example, if one stakeholder vehemently disagrees with the weighting factor of another stakeholder, the evaluation weightings can be adjusted on the fly and iterations performed to see if that criterion change has any meaningful impact in the outcome. This can be a powerful tool to give transparency to all stakeholders and provide sensitivity testing of different scenarios. The numbered items in Figure 2 correspond to the numbered list below the figure. Decision support can be extended to input from outside your organization as well, such as community groups, industry partners, non-governmental organizations (NGO), or any other stakeholder your organization feels should have input in this process.

## Circular Economy

Last, but not least, opportunities should be considered to the degree your organization is currently positioned for and/or has the aspirations to endeavor in maximizing resiliency, increasing stewardship, and utilizing all the resources at a WRF. Water, nutrients, and carbon are resources that have economic, social, and environmental value. Biosolids and other biosolids-derived



## Over 300 Years' Service at Lakeside Equipment Corporation from Just 12 Employees

As Lakeside Equipment Corporation (established 1928) approaches its centenary, a total of just 12 of its employees have completed a combined service record of more than 300 years.

Renowned manufacturers of long-lasting water treatment equipment, including screens, screw pumps and grit collectors, Lakeside continues to engineer, develop, and provide top-quality water purification systems to municipalities and businesses throughout North America.

The company's President, Karen Wolk, has been with the Illinois-based firm for 39 years, but top of the tree for long service at Lakeside is Draftsman Supervisor James Snyder, who has worked for the business for 42 years.

Pete Kasch (Shipping and Receiving) has served with Lakeside for 31 years, while Linda Zimmerman (Engineering Assistant) has recorded a full three decades. The long-serving team also includes National Sales Manager, Jim McKee (25 years), Regional Sales Manager, Jim Aitkenhead (11 years), Inside Sales Manager, Keith Humphrey (17 years) and Tim Lim, Project Engineer, 20 years.

Vice President of employee-owned Lakeside Equipment Corporation, Dan Widdel, has 24 years of service, as does Mary Ann Bell (Receptionist) and Severo Sosa (Senior Draftsman); closely followed by George Fridrich (Draftsman/Parts Associate) with 23 years.



**Back row:** left to right: Mary Ann Bell, Jim McKee, Keith Humphrey, Dan Widdel, Jim Aitkenhead, Severo Sosa. **Front row:** left to right: Pete Kasch, Karen Wolk, Jim Snyder, Linda Zimmerman.

Completing the mammoth 310-year milestone presents an average of 22.8 years for each of the 12 long-serving members of the team.

Lakeside's Contract Administrator, Marian Widdel, commented: "Time flies by here, which is always a good sign. It was only just recently when we noticed that a combined figure for such a small number might be in the region of 200 or 250 years' service, but to see that is actually a total of 310 years clocked up by just 12 people is a truly great achievement. We very much back any move to attract new people to our industry, but you have to say that for our customers, there are many times when you simply can't beat calling upon all that experience from such very knowledgeable, hard-working and enthusiastic professionals."

# PLANNING FOR A (BIO)SOLID FUTURE

products are inherently valuable and include treated biosolids containing carbon, nitrogen and phosphorus (i.e. fertilizer) and renewable natural gas (i.e. vehicle fuels), hydrogen, etc.

With innovative research and development occurring at unprecedented speed, additional opportunities to create other valuable byproducts and associated market development is already happening. A BMP that is looking out 20-years or more can leverage those innovation trends and help organizations plan around how they might structure themselves to take advantage of generating additional revenue while also supporting environmental goals and regulations, as well as provide the local community and customers with beneficial products.

Imagine extracting ammonia (i.e. fertilizer) to grow crops rather than expending the energy to treat it to wasted nitrogen gas, harvesting CO<sub>2</sub> for commercial uses from a biogas upgrade system, turning biogas methane into methanol (fuel), producing biochar for soil amendments, or extracting thermal energy to reduce heating and cooling costs at your facility. There are continued research efforts actively being explored and being scaled to commercial viability presently, helping other robust programs pay for the future and reduce dependency on external resources. Not only this, but there are many synergies with private industries that have common interests and goals that may present even greater opportunities through partnerships that will help all organizations realize common objectives and achieve mutually beneficial goals.

Figure 3 shows examples of how this might look. Having a plan that addresses how your organization might approach this sort of integrated model is the direction our industry is heading. How is your organization going to guarantee a resilient future?

## Summary and Conclusion

The best way to grasp the future is to make a comprehensive and holistic plan today. One thing is certain and that is change. One day land application sites will be limited, PFAS will need to be dealt with, the infrastructure will age, and the capacity of our systems will need to increase. There are many opportunities to reduce risk and be prepared for a changing landscape, while becoming more self-sufficient and reducing costs. [DN](#)

## Authors

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Brown and Caldwell can provide expertise to navigate regulations and permitting, treatment and capacity upgrades, biosolids master planning, risk mitigation through program management and much more. For more information, contact Josh Donegan.



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# PFAS, PFAS, EVERYWHERE: Are We ‘The Ones’ Who’ll Treat Them?

By Rodney Shields, Chemist at North Davis Sewer District



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**“ As our technology and instrumentation become increasingly sensitive and specific for the detection of these compounds and their constituents, we could see even more target PFAS being added to the EPA’s list of target PFAS compounds.**

**I**f you’ve spent any time in the wastewater industry lately, then you may have heard about Per and polyfluoroalkyl substances (PFAS), which are a large group of synthetic chemicals known for their strong carbon-fluorine bonds, making them highly resistant to degradation in the environment. These substances (also referred to as forever chemicals) are man-made chemicals that have been used in a wide range of consumer products since the 1940s, such as non-stick cookware, water-repellent clothing, food packaging, and firefighting foams, and are suspected to be linked with numerous health conditions, cancers, and ailments. In March 2023, the EPA proposed the first-ever national drinking water standards for six specific PFAS compounds: PFOA, PFOS, PFHxS, PFNA, PFBS, and GenX chemicals. The proposed Maximum Contaminant Levels (MCLs) are set at 4 parts per trillion (ppt) for PFOA and PFOS, which are two of the most studied and concerning PFAS substances due to their persistence and the potential health risks that they pose. Although there are no PFAS standards currently issued by the EPA for wastewater, many experts in the industry have already foreseen the very real inevitability of PFAS regulation within wastewater facilities in the near future, mandating PFAS treatment, removal, and disposal/destruction.



PFAS

PFAS

PFAS

PFAS

PFAS

There are a couple of reasons why the wastewater industry may see an increased effort for establishing a standard for PFAS regulation soon. First, many industries (commercial laundromats, for example) have only a small concentration of target PFAS compounds detected in their waste discharge, per pound. However, when that same waste was analyzed using the PFAS Total Oxidizable Precursor (TOP) Assay (which is an analytical method used to detect and quantify a broader range of PFAS precursors), the same laundromats showed a five-fold increase of PFAS+PFAS precursor concentrations in their waste discharge. When those precursors make their way into the wastewater treatment facilities, they have found that the concentration of target PFAS compounds in their effluent is much higher than it is in their influent. This is primarily due to the oxidation of those PFAS precursors in the wastewater treatment process, which then inadvertently generates the larger target PFAS chains, such as PFOA and PFOS, within those facilities. Regulating industrial sources of PFAS and PFAS precursor discharges into the wastewater collection system, along with monitoring and regulating residential discharges of these compounds, poses an impending challenge for the industry, forcing us to collectively ponder and hypothesize how we might best be able to mitigate and reduce the concentration of these PFAS chemicals.

The second reason that the wastewater industry may see an increase in PFAS regulation is due to the production of biosolids at these facilities, and because of the high probability for the accumulation of PFAS compounds in high concentrations within the biosolids, which may be much more difficult to remove and/or treat for PFAS than a facility's effluent might be. An additional dynamic that complicates treatment of PFAS is that it has the ability to adhere to other particles in the mix, such as microplastics. Through research, PFAS has been shown to bind to microplastics via a combination of hydrophobic interactions and electrostatic forces, which means that microplastics may function as carriers for PFAS in the environment, potentially increasing their spread and impact. This interaction may challenge our efforts to manage and mitigate PFAS contaminants.

As our technology and instrumentation become increasingly sensitive and specific for the detection of these compounds and their constituents, we could see even more target PFAS being added to the EPA's list of target PFAS compounds. During a presentation at the Tri-State seminar in Las Vegas, NV in August 2024, John Shaffer (CEO and Principal Scientist for EEC Environmental) stated that "we are finding that EPA Methods 1633, 1621 and TOP Assay analyses are revealing much more PFAS than previously identified." John also hinted at the inevitability of upcoming EPA Standards for PFAS in wastewater, and that while there is no set date as to when the EPA will require PFAS regulation in wastewater, those of us in the industry would be well advised to be proactive in educating ourselves and our staff about the possibilities of near-future PFAS regulations and treatment (and what that might entail), which method(s) might be used for the facility's PFAS identification and regulation purposes (EPA Method 1633 is designed to measure PFAS in environmental samples), and how PFAS standards and regulations may in fact change the way that we treat wastewater in the future. The PFAS storm is coming; will we be ready to treat it? [DN](#)

“

The PFAS storm is coming; will we be ready to treat it?

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A large-scale view of the AquaPrime Cloth Media Filtration System. It features multiple parallel rows of green, fibrous cloth media mounted on a rotating mechanism. The cloth is held in place by a series of black metal frames and rollers. The background is a clear blue sky.

# AquaPrime®

## CLOTH MEDIA FILTRATION SYSTEM

### ADVANCED TREATMENT FOR PRIMARY WASTEWATER AND INDUSTRIAL APPLICATIONS

The AquaPrime® filtration system utilizes OptiFiber PF-14® pile cloth media in a disk configuration with three zones of solids removal to effectively filter wet weather flows without the use of chemicals. The system is designed to handle a wide range of flows in a fraction of space compared to conventional clarifiers.

AquaPrime is ideal for primary filtration, primary effluent filtration and industrial wastewater due to its proven removal efficiencies and high quality effluent, even under varying influent conditions.

- Specifically designed floatable and settled solids removal zones
- Reduced energy costs in the secondary process due to reduction in organic loading
- More solids for increased biogas production in anaerobic digesters
- A footprint that is 15-20% of conventional primary treatment

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#### Linda County Water District, Olivehurst, CA

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- TSS removal greater than 75%
- BOD removal up to 60%

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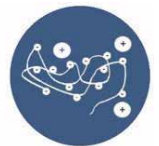
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