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2019

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FLUSHABLE WIPES:
— SHOULD WE BE CONCERNED? —

INSIDE:

WEAU's Annual Conference Recap ■ Finding and Training the Operator of the Future

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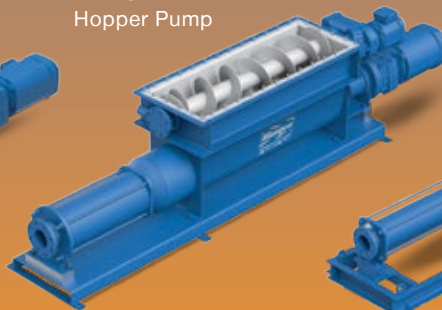
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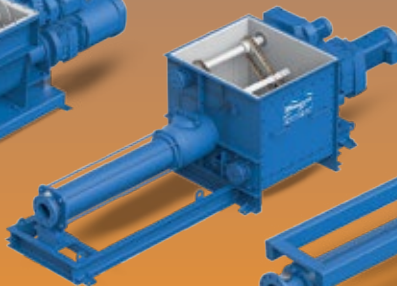
KL-S
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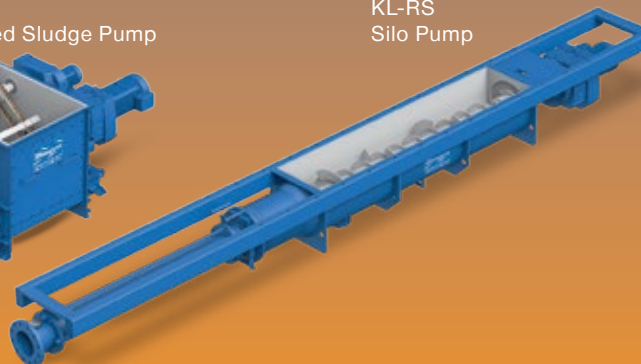
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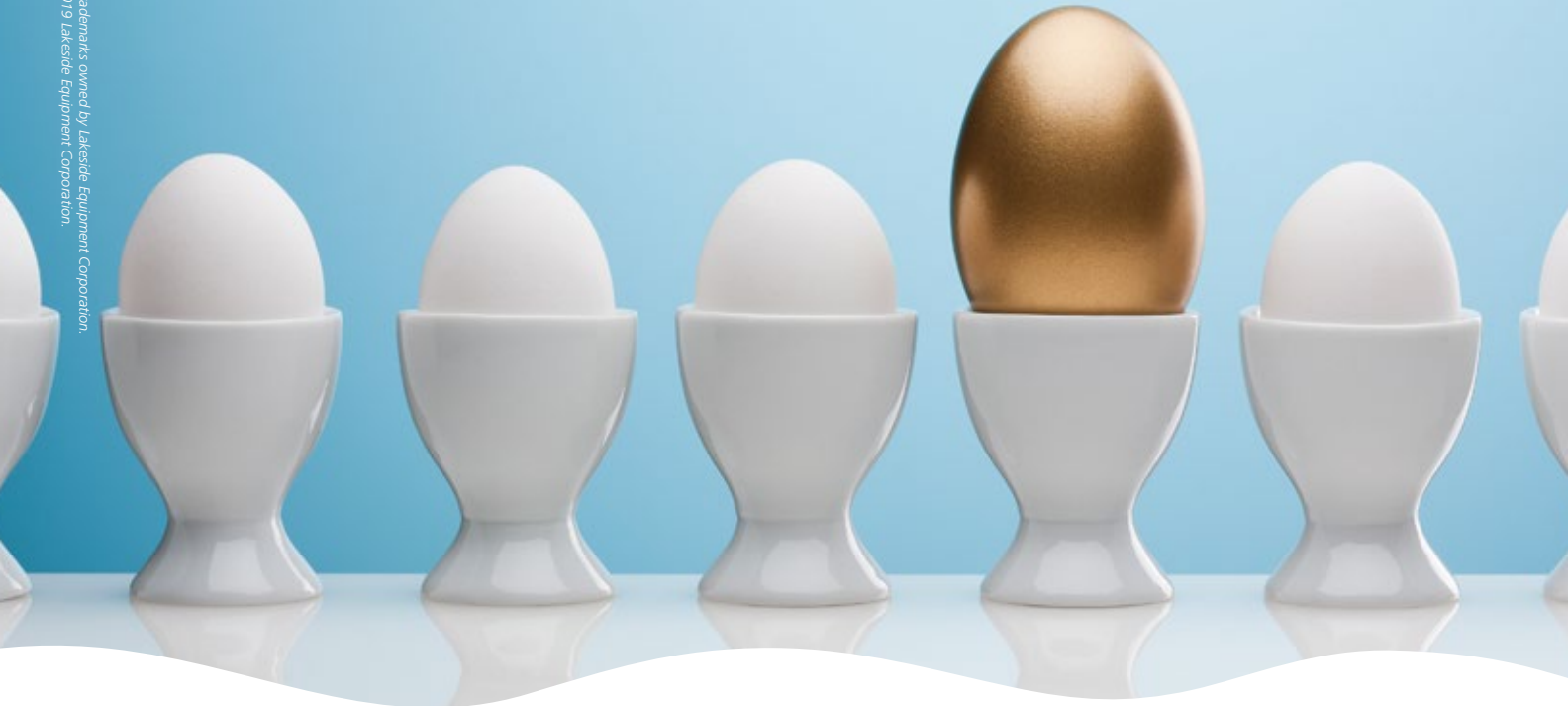
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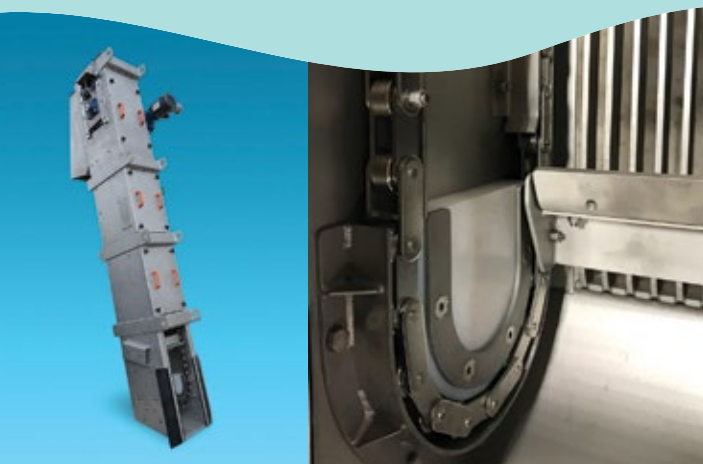


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Giles Demke

Annual WEAU Conference Highlights

If you know me personally, you may know that public speaking and writing are not my forte. So, with that in mind, I am writing the first article of my career.

During the month of April, WEAU hosted the Annual Conference in St. George, UT, and once again it was a great success due to the hard work of Jeff Beckman (Past President), the Conference Committee, and all the volunteers that put in countless hours preparing for and presenting the event. Noteworthy events include the Pre-Conference, which outlined current employee hiring and retention techniques, and the great technical presentations, including an informative Jeopardy round hosted by Dr. Erica Gaddis from the Utah Division of Water Quality.

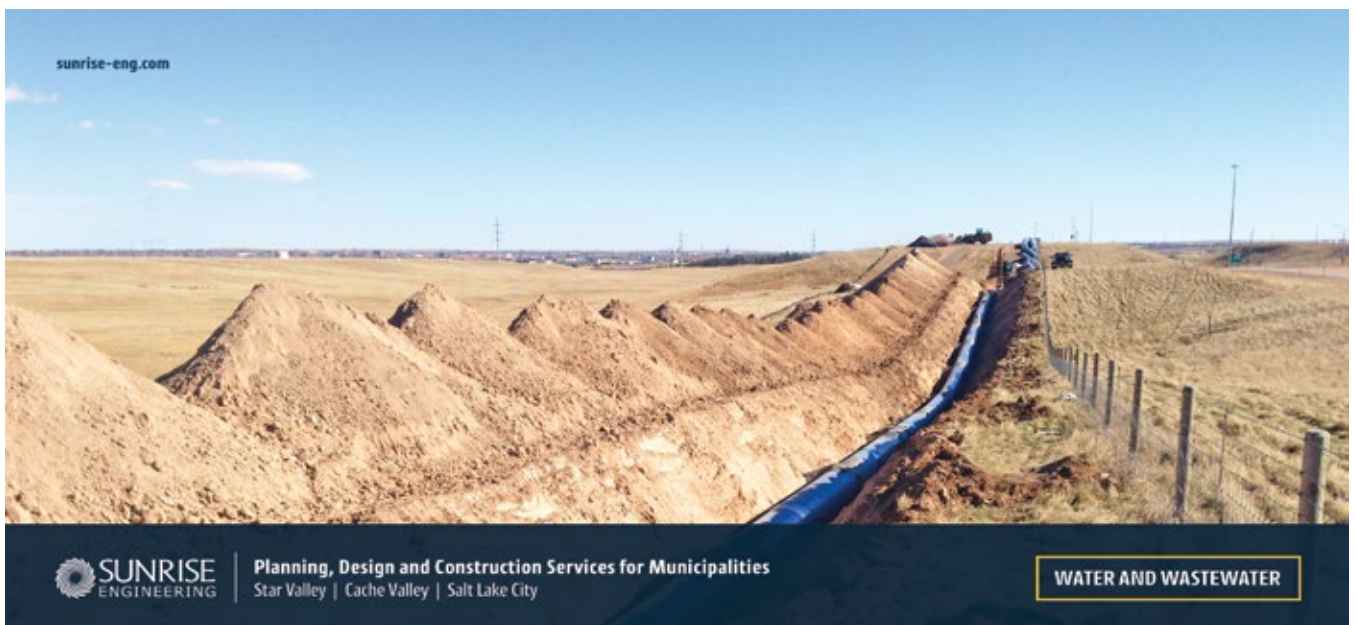
A high note of the conference was, as always, the Operations Challenge. This two-day event pits teams from across Utah in five different challenges or events. This year there were nine teams competing, including a composite team made up of members from three different organizations and two first-time teams – from Salt Lake City Water Reclamation and from the

Division of Water Quality. While these teams compete against each other for trophies and bragging rights, there is never a lack of support shown for one another. Each team member supports one another, giving encouragement and high-fives. I have attended many events and conferences outside of Utah and when others find out I am from WEAU they want to know how we produce such an outstanding challenge. My answer is always the same: it's the people, both those participating and those supporting the team. This is what makes WEAU and the Operations Challenge so successful. This attitude of helping one another is prevalent throughout our organization. I have witnessed time and again people reaching out to others when a problem arises; and each time others are ready to lend a hand or to give advice.

As I mentioned before, the Pre-Conference addressed one of the biggest concerns facing our industry – the hiring and retention of good, qualified people from all walks of life. Our industry is changing. Long-time members are retiring and these positions must be filled. It is

estimated that over the next five years we will lose up to 50% of our workforce to retirement. The wastewater community is unique. A person straight out of high school can be hired and trained on the job, building a career for themselves in this field. With this in mind, training our people is of the highest importance. Over the next year, WEAU will be committed to providing training and education opportunities for our workforce. In conjunction with this effort, I would encourage our seasoned people to take the time to mentor someone, share what you know, and pass along your 'water legacy.' Your knowledge is invaluable and must be passed down to the next generation of workers. The WEAU Board welcomes any suggestions on training events that would be most beneficial to facilities and districts. Again, I would personally like to express my thanks to all those who volunteer their time and effort in making WEAU the organization that it is. [DN](#)

Giles Demke



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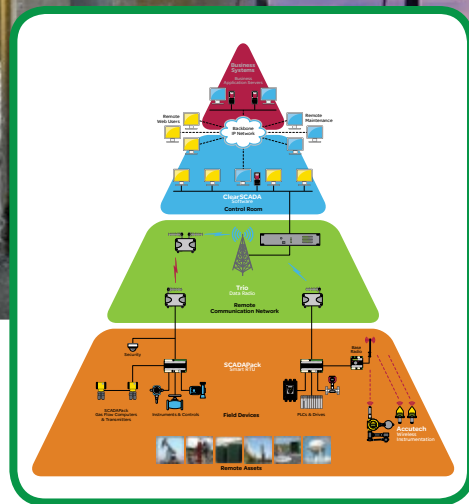
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What Do You Think of This Weather We've Been Having?

Chad Burrell

An old friend of mine did not own a car, so I used to give him rides when he needed to go somewhere. Without fail, every time I picked him up he would climb in the cab of my truck and ask, "What do you think of this weather we've been having?"

He would ask this question whether it was rain or shine outside. I imagine he would still be asking that same question this year, and there would actually be something to talk about.

I don't want to play weatherman, but it is interesting and educational at times to compare the history of the weather


and seasons. In 1874 in SLC they started tracking rainfall. Here are some of the stats comparing this last year to the previous 145 years in SLC:

- Temperatures for May 2019 were two degrees lower than average.
- Total spring precipitation was above average, and this was with no considerable snowfall.
- We have received 11.19 inches of spring rainfall, with three consecutive months getting over three inches each month and May ending with 3.78 inches of rainfall. To compare this,

Utah typically only gets 12 inches of moisture on an average year.

- Even dry St. George has had the most rainfall ever in the first five months of the year.

So, with that said, I do hope we are at least out of the snow and we can count on one inch of rainfall weekly, so I don't need to water my lawn and garden. Who could I talk to, to schedule this?

On a side note, the annual conference was a great success and a lot of fun. Enjoy the follow-up, photos and results. Thanks for everyone's hard work. 

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A Quick Word

By Clay Marriott, PWO Representative
 claym@centralweber.com

First of all, I want to say thank you for all the support of the Operations Challenge, and thanks to all the people and the entities that support in any way. Thanks to all the teams that participated in the Ops Challenge and came to show off their skills. This year was no exception with nine teams competing, and several first time participants, the competition was very close when the scores were tallied up. Congratulations to Central Valley on the first-place win. We had a very good

WEAU annual conference in St. George this year with many great activities and learning opportunities. The most enjoyable part for me is to be able to rub shoulders with all of you and become friends, as well as to hear stories of the impact and important things you do on a daily basis to improve all of our lives. We are planning some great learning, and continued education opportunities that will be posted on the WEAU web page at www.wEAU.org/index.php. Thanks for your support. We have a great year planned, so I hope to see you soon. 



2019 WEAU Operations Challenge Results

Team Name	Safety			Laboratory			Maintenance		
	Time	Score	Rank	Time	Score	Rank	Time	Score	Rank
#1 DWQ	838.30	60.00	9	830.40	62.13	8	945.35	60.00	9
#2 South Valley	396.50	92.59	6	665.65	83.36	7	604.91	90.17	5
#3 Salt Lake City	639.80	74.64	8	846.94	60.00	9	635.16	87.49	6
#4 Snyderville Basin	458.80	87.99	7	577.18	94.76	2	686.46	82.94	8
#5 Composite	342.30	96.58	3	662.47	83.77	6	594.22	91.11	4
#6 North Davis	389.70	93.09	4	613.58	90.07	4	656.31	85.61	7
#7 Cottonwood	300.10	99.70	2	598.95	91.95	3	493.94	100.00	1
#8 Central Valley	390.20	93.05	5	536.47	100.00	1	538.22	96.08	2
#9 Central Weber	296.00	100.00	1	647.84	85.65	5	558.31	94.30	3
Comments	First place formatted in red.								
	Second place formatted in blue.								
	Third place formatted in brown.								

Team Name	Collection			Process			Final	
	Time	Score	Rank	Time	Score	Rank	Score	Rank
#1 DWQ	300.25	60.00	9	-1300.00	73.76	5	315.89	9
#2 South Valley	195.50	84.02	7	-1885.00	82.61	4	432.74	5
#3 Salt Lake City	231.90	75.67	8	-390.00	60.00	9	357.80	8
#4 Snyderville Basin	136.65	97.51	3	-860.00	67.11	8	430.31	6
#5 Composite	171.22	89.59	6	-995.00	69.15	7	430.20	7
#6 North Davis	165.50	90.90	4	-1960.00	83.74	3	443.41	4
#7 Cottonwood	126.81	99.77	2	-1110.00	70.89	6	462.30	3
#8 Central Valley	125.80	100.00	1	-2335.00	89.41	2	478.54	1
#9 Central Weber	166.48	90.67	5	-3035.00	100.00	1	470.62	2

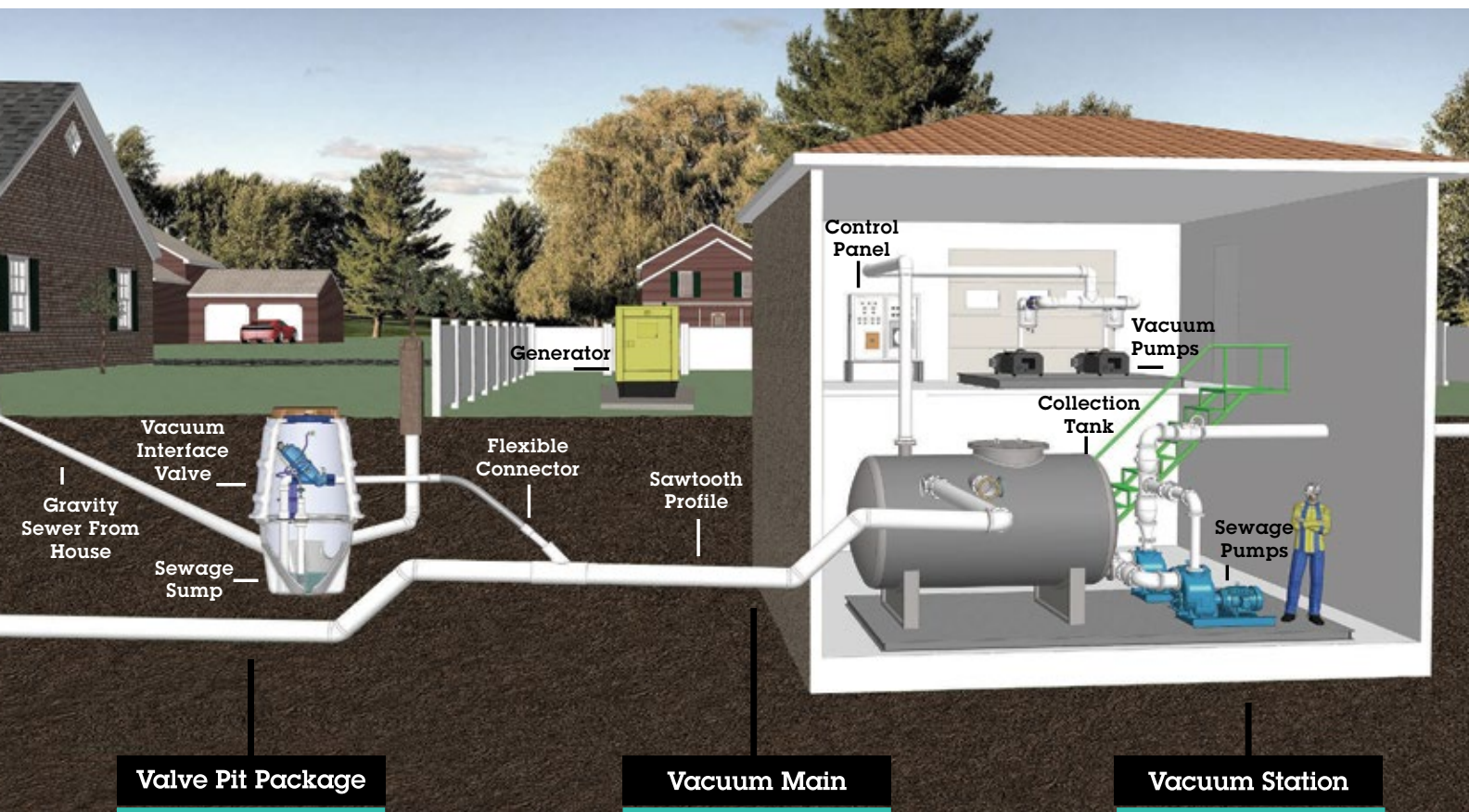


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Operator Spotlight: Dan Johnson

By Clay Marriott

Dan Johnson has worked for Salt Lake City Water Reclamation Facility for 16 years where he is a wastewater mechanic. Since starting in 2003 Dan has acquired a Waukesha Engine Certification and is working on getting his Crane Operators and Treatment certifications. When asked what his favorite part of his job is, he said he enjoys working on and keeping the older equipment running. He also enjoys teaching and showing the newer employees the 'do's and don'ts' of being an operator, to keep them safe. Dan sees each day as a new learning opportunity to make the most out of.

Dan grew up in the Magna/West Valley area and graduated from Cyprus High. He has a wife, Hddie, along with six step kids, all currently living in his home town of Magna. Dan and his wife enjoy spending time with family and friends playing games and attending barbecues; and Dan also enjoys golfing and fishing, whether it is in the summer or on the ice. He loves to attend all sporting events, one of which is to attend tailgating at the U of U football games. Something most people wouldn't know about Dan is that he is an accomplished bowler.

This past April was Dan's first time in the Operations Challenge. He had a great time learning the events and the overall experience of the competition. He is looking forward to continuing to participate in the Operations Challenge in the upcoming future. [Dn](#)



“ When asked what his favorite part of his job is, he said he enjoys working on and keeping the older equipment running. He also enjoys teaching and showing the newer employees the 'do's and don'ts' of being an operator, to keep them safe.

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1. Which test best represents the readily degradable organic material?

- BOD
- cBOD
- COD
- rCOD

2. What is the typical domestic ratio of chemical versus biochemical oxygen demand?

- 0.5:1.0
- 1.0:1.0
- 2.0:1.0
- 4.6:1.0

3. At what BOD/COD ratio does biologic treatment become difficult?

- 0.3
- 0.5
- 0.7
- 0.9

4. Which test measures organic content directly?

- BOD
- COD
- TOC

5. What solids test is used to check efficiency of sedimentation?

- DSS
- FSS
- SS
- VS

6. What is name of the solids passing through a 1.5-micron filter?

- DSS
- fSS
- TDS
- TSS

7. Rank wastewater solids in size from largest to smallest.

- Colloidal, Particulate, Dissolved
- Dissolved, Colloidal, Particulate
- Particulate, Colloidal, Dissolved
- Particulate, Dissolved, Colloidal

8. Which characteristic will influence the release of odors the most?

- BOD
- pH
- TSS
- Temperature

9. Alkalinity is the sum of which ions?

- Bicarbonate
- Bicarbonate + Carbonate
- Bicarbonate + Carbonate + Hydroxyl
- Bicarbonate + Carbonate + Hydroxyl + pH

10. Typically what percentage of human fecal material is composed of coliform bacteria?

- 10%
- 25%
- 50%
- 99%

ANSWERS:

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



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Defining Pipe Lining

Quiz produced by Pipeline Renewal Technologies

1. **What does 'CIPP' stand for?**
 - A. Crafted in Place Pipe
 - B. Closed in process pipe
 - C. Closed in place pipe
 - D. Cured in place pipe

2. **Cured-in-place pipe is a resin-saturated, flexible fabric that is _____ or _____ into the existing pipeline.**
 - A. Inverted or ballooned
 - B. Inverted or winched
 - C. Sealed or winched
 - D. Sealed or ballooned

3. **What gives CIPP is structural integrity?**
 - A. The host pipe
 - B. Ethyl methyl Esters
 - C. Fiberglass
 - D. Hardened resin

4. **Which is not a curing method?**
 - A. Thermal
 - B. Ultraviolet light
 - C. Ambient air
 - D. Pressure

5. **In order to use CIPP lining, infiltration needs to be stopped.**
 - A. True
 - B. False

6. **When do you need to TV a line for CIPP installation?**
 - A. Pre and post lining
 - B. Only if it's dirty
 - C. Post lining
 - D. Only for pipe defect

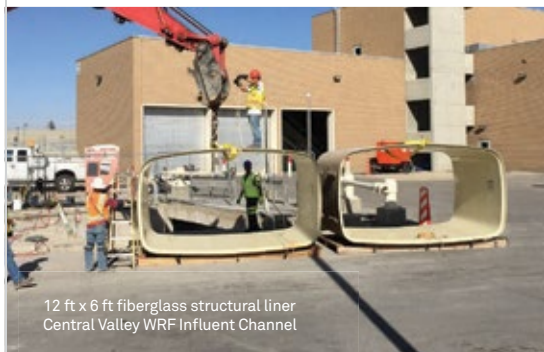
7. **What are the two types of cure methods?**
 - A. Mechanical and Chemical
 - B. Thermal and Ultraviolet Light
 - C. Thermal and Hydraulic
 - D. Mechanical and Ultraviolet

8. **Which of the following is not a fabric option for CIPP liners?**
 - A. Acrylic
 - B. Fiberglass reinforced felt
 - C. Felt
 - D. Glass-fiber reinforced plastic (GFRP)

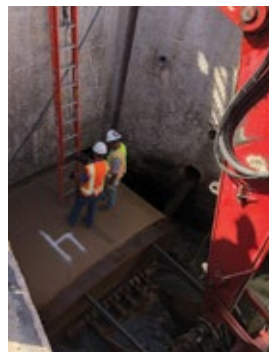
9. **The process of impregnating the fabric material with resin is called _____?**
 - A. Spray out
 - B. Roll out
 - C. Wetting out
 - D. Flush out

10. **Which of the following is the most popular resin type (primarily because it is most cost-effective)?**
 - A. Epoxy
 - B. Polyester
 - C. Esther resin
 - D. Vinyl ester

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



12 ft x 6 ft fiberglass structural liner
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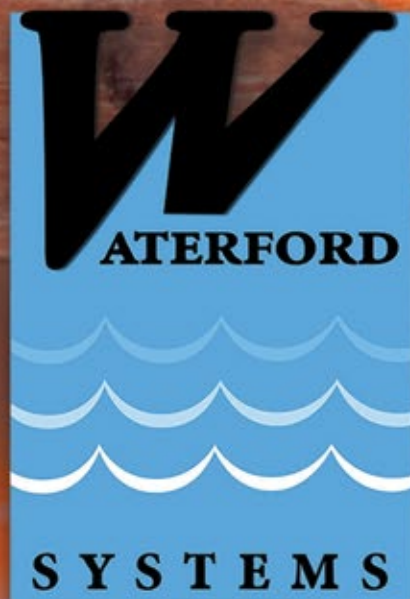


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2019

WEAU ANNUAL CONFERENCE SUMMARY

APRIL 10 - 12, 2019 | ST. GEORGE, UTAH

BLOOD DRIVE AT WEAU ANNUAL CONFERENCE




The Annual Blood Drive took place on Thursday, April 11, from 9 am to 2:30 pm. The Red Cross (www.redcross.org) was able to collect 25 pints from 25 presenting donors. Each donation has the potential to save up to three lives, so the 25 pints could save up to 75 lives. A HUGE thank you to everyone who came and donated.



KEEPING IT IN THE FAMILY

Three generations in wastewater: Nathan Cloward, Central Davis; Sherman Cloward, Trustee, Central Davis; and Chett Cloward, Central Weber.



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2019 AWARDS LIST

INDIVIDUAL AWARDS

**Collections Operator Award
(Over 5 MGD)**
Jonathan Gubler

**Collections Operator Award
(Under 5 MGD)**
Clint Giles

Maintenance Specialist Award
Hadley Gunn

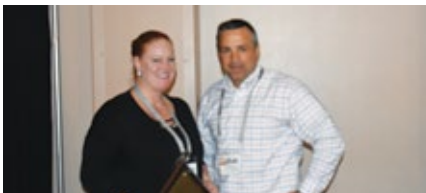
**Operator Award
(Over 5 MGD)**
Jace Woodrow

**Operator Award
(Under 5 MGD)**
Jeff Lennert

**Operator Award
(Under 5 MGD)**
Randy Stevens

Supervisor Award
Steve Desmarais

Supervisor Award
Kevin Hall



Pretreatment Specialist Award
Talena Walton



Young Professional Award
James Dixon



Clay Pigeon Winners

FACILITY/PROGRAM AWARDS



Collections System (Under 5 MGD)
Magna Water District



Collections System (Over 5 MGD)
North Davis Sewer District



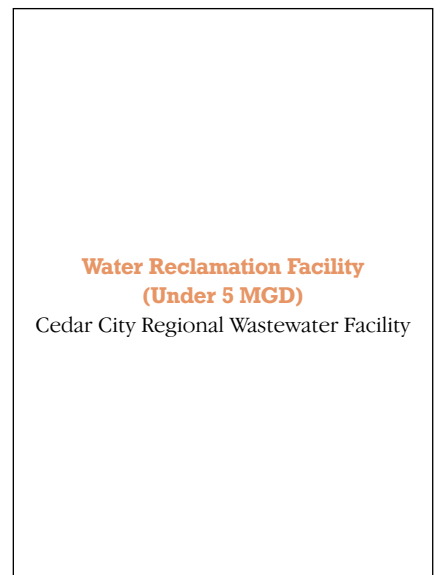
Safety Program
North Davis Sewer District



Biosolids Program
Central Valley Water Reclamation Facility



**Water Reclamation Facility
(Over 5 MGD)**
Provo Water Reclamation



**Water Reclamation Facility
(Under 5 MGD)**
Cedar City Regional Wastewater Facility



2018 WEAU Excellence Award
Central Valley Water Reclamation Facility



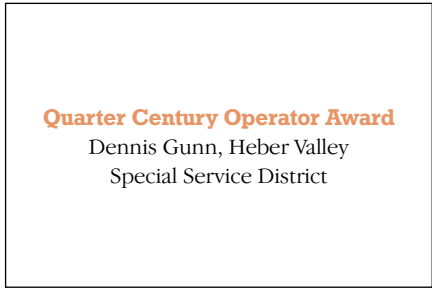
Pretreatment Program
Central Valley Water Reclamation Facility

WEF AWARDS



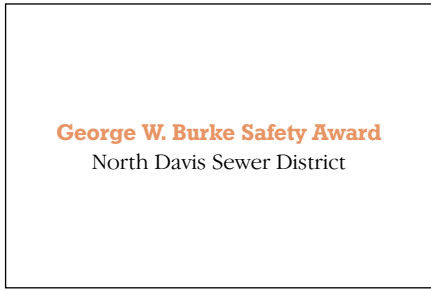
WEF Guests

Steve Harrison and Eileen O'Neill



Quarter Century Operator Award

Dennis Gunn, Heber Valley
Special Service District



George W. Burke Safety Award

North Davis Sewer District



Quarter Century Operator Awards

Mario Aguilar, Snyderville Basin Water
Reclamation District



Hatfield Award

Ken Burgener, North Davis Sewer District



Arthur Sydney Bedell Award

Thomas Holstrom Central Valley Water
Reclamation Facility



Lifetime Member Award

Dan James



WEF Delegate Service Award

Lonn Rasmussen



The Passing of the Shovel

Jeff Beckman and Giles Demke



Shovel Awards SSSSS

Tim Madsen, Gary Vance, Jeff Macfarlane, Jeremy Deppe

OPERATOR CHALLENGE 2019



Central Valley 1st Place



Central Valley (WINNERS)



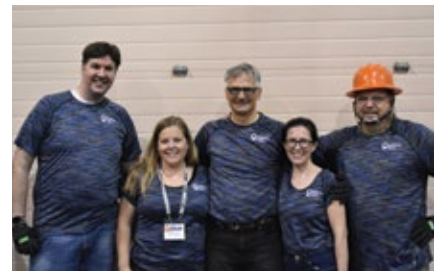
Central Weber



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North Davis



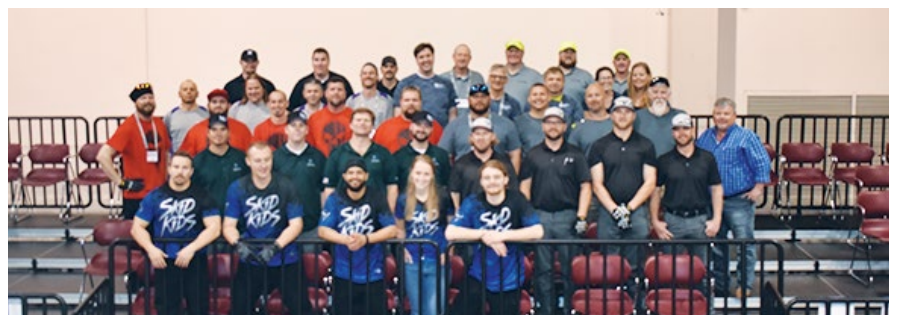
SLC Water Reclamation Facility



Snyderville



South Valley Water Reclamation Facility



Op Challenge Teams

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Young Professionals Breakfast



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The Annual Conference YP Breakfast was held at the Black Bear Diner. We had a wonderful turnout that included various students and professionals. It is always a lovely opportunity to get to meet others in our field and have a good breakfast before the conference.

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FLUSHABLE WIPES: — SHOULD WE BE CONCERNED? —

BY KEN BURGNER, NORTH DAVIS SEWER DISTRICT

Recently, KSL-TV ran a story on a problem that flushable wipes were causing in West Haven, UT. The mayor posted a picture on West Haven City's Facebook page, of a wad of wipes and other debris that caused a little commotion. The Superintendent over Sewer & Water, John Wallace was interviewed about the problem and some concerns they are facing.¹

This is definitely not a local problem. In a 2017 article from the National Geographic website titled, *Huge Blobs of Fat and Trash Are Filling the World's Sewers*, the problem started getting some traction. "On September 12, workers in London discovered one of the biggest fatbergs ever seen, in the East End neighborhood of Whitechapel. Measuring more than 800 feet long, the monstrosity weighs an estimated 130 metric tons and is the size of 11 double-decker buses, according to the London utility provider Thames Water."² Once this kind of publicity started coming out, the flood

gates opened up and now almost daily you can find sewer entities everywhere reporting problems with fats, oils, and grease (FOG) and the associated problems when combining with the wipes. The average taxpayer may still be oblivious, but because of the impact on fees, the problem is harder to hide.

In a May 14, 2019, article about Miami-Dade Water and Sewer Department (WASD), *Wipes Clogging Up Miami-Dade Sewer System*, "It costs about \$200,000 a year just to haul the rags at the pump stations and treatment plants to the landfills, so they can be disposed of properly. Last year, WASD spent more than \$525,000 to unclog more than 650 blockages within the thousands of miles of sewer lines. Add about \$2.7 million dollars a year for labor, materials, and tools, and the total cost to deal with rags annually is about \$3.5 million dollars." He clarified, "Rags are classified by WASD as items that do not break down in sewer water including

paper towels, clothing, hair, female products, hygiene products, and wipes: both non-flushable and flushable."³

"While it's true that wipes are a great way to practice better hygiene, they aren't ideal for being flushed down the toilet. Unlike toilet paper, wipes are not specifically designed to break down and dissolve in bathroom water. In fact, wet wipes were labeled the biggest villain of 2015 by The Guardian.

Why are they so villainous, you may ask? Unlike toilet paper, wipes are designed to be durable enough for heavy-duty tasks such as wiping up messes, cleaning surfaces, and (yes) that kind of duty too. In order to accomplish this task, wipes are typically composed of various nonwoven fabrics such as polyester, polypropylene, viscose pulp, and cotton."⁴

"When we put [the wet wipes] in a stand mixer filled with water and pushed the slowest speed (more churning than your waste pipe will provide), it took at

Wipes were not initially created with flushing in mind, and now, as an afterthought, companies are struggling to find ways to deal with flushability issues.

least 10 minutes to break each into small pieces. That means you may not want to flush 'flushable' wipes."

As you can see, toilet paper was created to counteract the issues with clogging that we see today. Because it is degradable, it does not clog any pipes, which means it allows for the sewage system to do its job. Wipes, on the other hand, were not initially created with flushing in mind, and now, as an afterthought, companies are struggling to find ways to deal with flushability issues.

Do We Really Know if Wipes are Actually Harming our Sewage Systems?

Yes. Let's look at New York for example. According to an article written by *The Commissioner's Corner*, the use of wet wipes in New York doubled back in 2008. The article also indicated that wipes show up in the sewage system intact, which can cause clogging and damage to essential sewage system equipment.

This article suggests that wipes are directly contributing to the cost of maintaining city plumbing:

"In addition, there is a cost associated with removing the additional material to landfills. Since companies began marketing these wipes as flushable, DEP's shipping and landfill costs have increased by as much as \$3 million each year."

This fact alone suggests that wipes are a significant contributor to the problem of clogging in our sewage systems.

The clogging of sewage systems isn't just occurring in New York – it's happening everywhere. Here is a non-exhaustive list of articles and important quotes to highlight issues:

- **Canada:** Canadian taxpayers are reported to be paying at least \$250 million per year in order to repair any damages that wipes cause to their sewage system.
- **Miami, FL:** "Miami-Dade County's sewer department launched a campaign against 'flushable wipes', joining a

national effort to keep the popular products out of the toilet. "It's hard to believe the kind of problems that these things are creating," said county sewage chief Lester Sola. "There are some pump stations where we have to go almost on a daily basis to solve these issues."

- **The Bay Area:** "Wipes aren't just clogging sewage systems in San

Francisco, but all over the Bay Area and you're paying the bill. In San Jose, officials say wipes stuck in the sewage system cost ratepayers up to \$1 million a year – and that's just one city."

- **Washington, DC:** "For instance, in Washington, DC, where municipal pipes are old and small, flushed wipes can build up and create blockages as soon as they enter the sewer system," says

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Hiram Tanner, Pumping Manager at the District of Columbia Water & Sewer Authority, “We have to send someone out to clear out the sewers.” Wipes that pass through pipes can get hung up in the city’s wastewater equipment, he asserts, “We have to clean the pumps out and repair them. Those that make it past the pumps get caught in screens that city employees clean with pitchforks.”


- **New York City:** “In New York City, the Department of Environmental Protection has spent more than \$18 million over the past five to six years to remove the wipes from its facilities, according to Deputy Commissioner Vincent Sapienza.”
- **Wyoming, MN:** “Last month, the city of Wyoming, Minnesota filed a federal class-action lawsuit against six makers of pre-moistened flushable wipes for alleged harm to their infrastructure. Brought on behalf of cities grappling with similar problems, the lawsuit seeks \$5 million and a declaration from the court that the wipes advertised as flushable are not safe for sewer systems.”

- **Orange County, CA:** “Orange County in California spent \$2.4 million in the past five years on new equipment to deal with the wipes. It also spent more than \$300,000 in one year to unclog pumps.”
- **Columbus, GA:** “Columbus, Georgia spent \$550,000 in the last two years on new grinding equipment and spends \$250,000 a year extra on costs related to wipes.”
- **Vancouver, WA:** “Vancouver, Washington spent \$1.5 million from 2008 to 2013 on new pumps, additional labor to unclog other pumps and extra electricity for pumps due to the wipes.”
- **Raleigh, NC:** “In Raleigh, North Carolina, the biggest sources of sewer overflows and backups are rags and debris, mostly flushable wipes,” says Marti Gibson, the city’s environmental coordinator for wastewater. “A Raleigh ordinance prohibits flushing anything except human waste, toilet paper and water,” Gibson says.

As you can see, toilet paper was created to counteract the issues with clogging that we see today. Because it is degradable, it does not clog any pipes, which means it allows for the sewage system to do its job. Wipes, on the other hand, were not.

- **San Antonio, TX:** “Those so-called ‘flushables’ like cleansing wipes and feminine hygiene products won’t clog your toilet if you’re lucky,” said Anne Hayden, a spokeswoman for the San Antonio Water System. “But, they will cause major damage to your sewer system, and they may contribute to sewage backing into your home or office.” The City of Dallas has even started a campaign against flushing wipes down the drain known as Defend Your Drains.”⁴

The problem is widespread in North America and around the world. If we ignore the problem, it is to our own peril, whether that be because of increased costs for treatment or backups and may pose possible health risks – a topic for another time.

¹www.ksl.com/article/46538985/fatbergs-are-a-reminder-of-what-not-to-flush
² www.news.nationalgeographic.com/2017/08/fatbergs-fat-cities-sewers-wet-wipes-science
³www.miami.cbslocal.com/2019/05/14/flushable-wipes-miami-dade-sewer-system
⁴www.pristinesprays.com/blogs/news/are-wipes-flushable-what-does-flushable-even-mean-and-should-i-care 

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WANGEN TOOK THE PLUNGE INTO THE AMERICAN MARKET

About four years ago a new player came to town.

Pumpenfabrik Wangen, GmbH had been manufacturing Progressive Cavity Pumps for almost 50 years, since 1969. They had a major share of the European market, had great success in the UK and were breaking into Asia, the South Pacific and other parts of the world. It was now time to go after their share of the market in America. In 2014 Wangen America, Inc. opened just over the fence from O'Hare airport in Wood Dale, IL. Word spread across the US and the distribution network began to grow.

Wangen manufactures Progressive Cavity (PC) Pumps designed for conveying very low to very high viscosity materials, from thin polymers to dewatered cake with up to 45% suspended solids. Their KB22S line is ideal for dosing small amounts of polymer at very low pressure, while their KL-RQ Triplex pumps are capable of moving 300 cubic feet or more of dewatered cake per hour over a distance of 500 feet at discharge pressures over 500 psi. Whatever the challenge, when it comes to conveying viscous media, Wangen PC pumps can handle it.

The home office of Pumpenfabrik Wangen is located in Wangen, in the Allgäu region of southern Germany where

three countries – Austria, Switzerland and Germany – come together at Lake Constance. They started there in 1969 as a small family enterprise and have grown to over 200 employees with a significant foot print in the Progressive Cavity Pump market. Their unique business philosophy attracts young people just entering the professions and trades of engineers, machinists, programmers and fabricators. Over 15% of their employees are fresh, entry level people coming from their scholastic and trades training. They work side by side with skilled craftsmen and learn how to produce high quality products. Many of the young folks stay on year after year as more new comers join the team. This blend of fresh new energy and ideas joining with the seasoned and experienced professionals makes for a crew of highly capable people who produce truly quality products.

As Wangen grew over the years, the results of their hard work and ethics were noticed. The value of what they had established was recognized by others with the financial and management capability needed to help Wangen rise to the next level. In June 2017 Wangen Pumpenfabrik was purchased by private equity group,

Silverfleet Capital. With this move Markus Hofheinz took the helm as CEO. He brought with him extensive management and financial expertise, with years of executive experience including a senior management role with Mercedes Benz.

This management and financial boost has given an already successful and capable enterprise the resources needed to rise to an even higher plane. Wangen America, Inc. has moved to larger and better facilities in Elk Grove Village, IL and has attracted management and staff from other market players allowing them increased inventory and support capabilities.

Wangen's pumps are used in a number of different applications as well as Wastewater, such as Bio Gas, Waste Foods, Agriculture and any place where viscosity is a challenge. But for this article, we'll stick with wastewater applications.

Primary and Secondary Sludge is something most of us deal with. Wangen's KL-S series pumps are the work horses of wastewater facilities. Specifically designed for conveying media with ~ 4% to 12% suspended solids, they are versatile and effective. The KL30S 10.1, for example, will pump roughly 1 gpm at 50 rpm at about 60 psi, while the KL80S 145.0 will pump

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over 700 gpm in excess of 100 psi at 250 rpm. These are pumps with direct pipe flange feeds with free flowing media.

Either for dewatering processes or as pipe lubrication we're probably handling polymers. A couple of years ago, Wangen introduced their KB22 series dosing pumps. These are slick little pumps for injecting slick products like polymers. They feature a flexible drive train without universal or pin joints. They are great dosing pumps that will accurately inject just the right amount of polymer or chemical required for your process.

Most of us in the water reclamation business handle high suspended solids applications such as dewatered sludge, which is heavy, sticky and thick. Wangen handily conveys such media with the KL-RX Triplex line. These pumps are capable of handling up to 45% dry solids at flow rates well over 250 gpm at discharge pressures well over 500 psi.

For any pumping application where the challenge is viscosity, high suspended solids with positive displacement accuracy, Wangen produces a pump to meet the challenge.

Historically, Progressive Cavity Pumps have had one drawback. You had to install them with a lot of room on the discharge side. Because the rotor could only be serviced by removing it through the discharge end of the stator, you had to allow for enough space, equal to or more than the length of the rotor, to remove it. NOT ANY MORE! While competitors addressed this issue with split stators or split housings, all of which create additional seal surfaces, Wangen took quite a different approach. X-Lift Technology now comes on the scene.

Wangen's X-Lift now allows the operator a simple way to disconnect discharge piping, disengage the rotor/stator and merely Lift the assembly off

the pump drive. It reassembles as easily as it disengages. No worries about sealing the stator surfaces or overtightening the stator on the rotor.

Other exclusive Wangen features are their IWD seal cartridge which makes it a whiz to replace mechanical seals, their standard automotive style Cardan Universal Joint, their standard bearing chair and a half dozen others make Wangen pumps a dandy choice when it comes to conveying primary and secondary sludge, dewatering feed stock, polymer injecting, dewatered cake or any other akin media.

Wangen's in the good ol' USA to stay. They've already earned a fair share of the market and you'll likely see them earn a fair share more.

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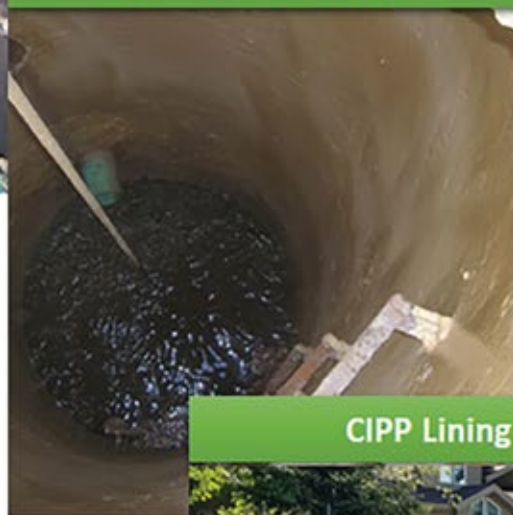
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Katherine Saltzman

Finding and Training the Operator of the Future

Amid retirement surges across the water workforce, there are ongoing discussions about the urgency to recruit, train, and retain new professionals. Part of this effort involves establishing the water sector as an attractive career path that supports essential infrastructure and protects public health and the natural environment.

However, the water sector faces additional challenges that most sectors do not. Training requirements and certification expectations vary among states and naturally among utilities that differ in size, revenue, and process capacity. But the challenges go deeper. They include limited access to updated, peer-reviewed training materials; inadequate time and money for operators to study or maintain continuing education requirements; and the challenges to keep pace with rapid technological changes. These challenges are in addition to equipping employees with the complex science, technology, engineering, and mathematics (STEM) components necessary to be a water operator.

However, solutions are emerging to overcome these challenges and secure the workforce of the future. Organization, states, and utilities are finding ways to attract and train the essential employees who will protect our infrastructure, environment, and public health.

Water Sector Uniqueness

As highlighted in the 2018 Brookings Institution report, *Renewing the Water Workforce: Improving Water Infrastructure and Creating a Pipeline to Opportunity*, many of the water sector's concerns about its workforce reflect similar social, labor, and economic concerns across all US sectors. These concerns include high retirement rates, limited pools of qualified replacements, and fear of technical knowledge loss. The report calls these concerns "emblematic of bigger economic trends and broader policy issues facing the country, including the continued need to support a new generation of workers amid mounting retirements, changing technologies, and other labor market shifts."

But where the water sector stands apart is the need for greater upfront preparation in terms of extensive training, skills, and knowledge competency. The Brookings report states a US Bureau of Labor Statistics finding that water sector jobs have a higher threshold for entry.

More than 78% of water workers need at least one year of related experience and 16% of water workers need four or more years prior to joining the water workforce. Moreover, about 44.7% of water workers need at least one year of on-the-job training to qualify for their positions. Compare this to the national average of 5.6% of jobs across all occupations that need more than one year of on-the-job training, according to the data.

In addition to on-the-job training, water workers are required to operate various technologies and tools as part of their daily responsibilities. These requirements add additional complexity to operator jobs and training. According to the Brookings report, "Water workers embody the definition of skilled trades. On average, water workers use 63 different tools and technologies each, compared to the six tools and technologies typically used by workers in all occupations nationally."

Entering the Water Workforce

Even though most sector newcomers lack operational experience, each still is required to passing a level one certification exam and possess hands-on experience as prerequisites for employment. With these considerations, utilities typically hire entry-level employees

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without a license and provide a certain amount of time for the employee to study for and pass a certification examination. Those who pass are then promoted to a full-time, certified operator position. This pre-certification periods ranges from 30 days in some states up to year in others.

“We have a chicken and egg system here: you can’t get hands on experience unless you have a license, but you can’t get a license without hands on experience,” said Sidney Innerebner, principal and owner of Indigo Water Group LLC, a wastewater consulting and operator training company. Innerebner also authors WEF’s new Wastewater Treatment Fundamentals series.

Supporting Continual Operator Training

Once hired, operators are expected to continue studying for higher certifications and collect continuing education units (CEUs). Larger utilities may have an in-house trainer who develops CEU curriculum related to facility processes or equipment. This trainer works with the entire operations staff to help prepare them for

certification exams. However, midsize and small facilities, which make up most treatment systems in the US, typically don’t have the resources to support in-house training. Therefore, operators self-study and use external trainers one online courses to prepare for examinations.

Despite the options available, there is concern among operators and trainers that the Need-to-Know (NTK) Criteria, which is tested for in certification exams and incorporated into curriculums for CEUs, may not always apply to the processes at an operator’s facility or be relevant to their daily responsibilities, Innerebner said. NTK criteria is extensive but lacks detail on which topics are necessary for exam preparation or responsibilities in the field, making it difficult for operators to study, she explained.

“One of the big issues with training is that it’s often geared toward more complicated systems. If you look online, you could probably find 100 classes on activated sludge but more than 85% of the treatment plants in the US are lagoon systems,” Innerebner said. “It’s hard to find training on lagoon systems or classes on wastewater treatment ponds.”

Additionally, acquiring CEUs and preparing for certification exam require time. In some cases, operators are given working time to prepare and test; this requires them to get shifts covered. In other cases, operators must use time-off to maintain their licenses and training.

In Colorado, for example, there are weeklong operator training classes, which would meet the entire training requirements for three years, Innerebner said. But this requires coverage at the facility as well as travel expenses.

Other options include online training, which provides more scheduling flexibility. Indigo Water Group has about 650 operators enrolled in online training class.

“Operators like it better so you can do it over time, it’s a little easier to incorporate in the day,” Innerebner said.

Updating Materials

Significant portions of operator training materials, including US Environmental Protection Agency (EPA) manuals, have not been updated since the late 1970s or the 1980s, Innerebner said. She added that training materials typically have been based on work practices at facilities instead of scientific research.

“We have learned a lot about wastewater treatment in the last 40 years, a lot of stuff has changed how we teach, has changed our understanding of the process,” she said.

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“We’ve been in a cycle of asking people in the field what they do every day at work and then basing training materials on that instead of setting standard practices based on scientific research. The result is a cycle that always looks backwards instead of forward,” she explained. To provide new training materials, WEF developed the Wastewater Treatment Fundamentals series. In addition to being double peer-reviewed by water sector experts, the series aims to assist in translating the world of wastewater treatment to individuals who have held technical jobs outside of the water sector.

“I try to take new concepts and relate back to what people already know. It’s easier to hang things on your framework, then to build a new framework all together,” Innerebner said. Because many operators come from mechanical backgrounds, it helps to relate new topics to familiar ones, she explained. For example, biology and bacteria can be compared, albeit imperfectly, to engines.

“Live with the imperfect analogy until you can get a better understanding of what’s actually happening,” Innerebner said. “That goes a long way with helping people learn.”

Keeping Pace with Technology

Utilities and trainers work to keep pace with rapid technological changes to ensure their staff and operators are prepared to handle new equipment. This has led to training that focuses primarily on technology at a facility. While this training is valuable, it needs to be coupled with education on the general curriculum.

“I am seeing more clients asking for very specific training on the technology they have at their location, onsite training for specific technology,” said Scott Jameson, a water and wastewater operator trainer and consultant in British Columbia, Canada, offers classroom courses and on-site training for utilities in the region.

Sometimes the tech training is to reduce a knowledge gap after losing a senior operator, other times, however, utilities are trying to multitask and prepare operators for certification exams and train them on new technology at the same time, Jameson said.

“I find them more and more willing to pay to have an instructor to come to their sites,” Jameson said, “This is tied into the idea that they want training focused on the technology they are using.”

He cautioned, however, that this doubling up doesn’t work well, if the goal is to pass a certification exam. Jameson said he takes the time to sort out this different with his clients. He works with them to clarify their objectives to provide the training truly needed.

The Operations Challenge competition held annually at WEFTEC, and similar state and regional events are examples of programing that combines operations training and skill



development with practice on new technologies. To keep the competition fresh and challenging, the events are redesigned periodically. These events introduce competitors to new processes and technologies and provide hands-on experience with new and different equipment.

Apprentice Programs and Technical Schools

One highly visible path for newcomers to enter a water sector career is through apprenticeship programs or technical schools. Some utilities have created these programs or built partnerships with local colleges to help facilitate the education and hands-on training necessary for an operator position.

South Platte Water Renewal Partners (formerly known as the Littleton Englewood Wastewater Treatment Plant) has done both. Cindy Goodburn, a WEF member who now works as an independent consultant to help organizations improve workforce development and organizational skills, started the apprentice

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program in the 1990s when the utility struggled to fill Operator A positions.

“At the time, we were focused on the A certification. Most A operators are really secure where they are working. They have the ‘golden chain,’ fully vested in all of their retirement stuff, maxed out on vacation – all those benefits that make it difficult to leave and start with a new organization,” she explained. “Our answer to golden chain was that we would build our own.”

Though there have been some changes, the goals of the apprentice program remain the same. Operators are given a designated time frame in which to obtain higher certification levels; they are incentivized with pay increases.

“Each time the person passed a new certification, they got promoted to a new operator certification and payline raise. We paid for all of their schooling, their books, certification exam.” Goodburn said, “But their end of the deal was that they had a certain timeframe in which to complete these [tasks]. The goal was to get all our operators A certified and there was a maximum amount of time. If at any of those points, they couldn’t pass the exam, we would have to terminate employment. But we’ve only had to do that a couple of times over all these years [that we have had this program] It’s just been a huge success.”

This facility also maintains a partnership with a local community college with a water quality management program. Many of the college students interned at the facility as part of their curriculum. These same students later joined the apprentice program to become operators.

Goodburn noted that utilities could help direct curricula at technical colleges to ensure colleges are preparing students for workforce needs. For example, when supervisory control and data acquisition (SCADA) systems were introduced to the facility, few staff possessed the needed skills to use them. As Goodburn searched for employees or students to fill the role, she discovered that the community college was providing outdated curriculum.

“The instrumentation and controls [curriculum] were in the electrical degree programs and it was so antiquated it wouldn’t do us any good,” she said. “That’s kind of my soap box on partnering with local educational institutions and helping them understand what is needed in the industry for their students to graduate and get into a job.”

Taking this collaboration one step farther, the Water Engineering Technology (WET) Program at Okanagan College in Kelowna, British Columbia, in Canada has a curriculum recognized by the Environmental Operators Certification Program (EOCP), which is the main certifying entity for the region. The WET program also is a nationally accredited engineering technology program. All certified engineering technology programs are mandated to meet regularly with an advisory committee to determine curriculum and skills needed for the workforce.

“We have to keep in contact with the industry. All of the Engineering Technology programs are mandated to have Program Advisory Committee that is comprised of individuals from different industries that our students would go and work in,” said Allison O’Neill, chair of the Water Engineering Technology Department. These committees “advise us on changes in the industry. We also ask them about our curriculum [and] when we propose curriculum changes, they review those changes to ensure it fits with the need of the industry.”

The committees include members from public and private sectors organizations, including the local municipalities, the water resource recovery facility, consultants, urban planners as well as representatives from the Province of British Columbia’s Ministries



of Environment & Climate Change Strategies, and Forest, and Lands and Natural Resources.

“We make sure that we have broad representation, we also try to make sure that our advisory committee includes WET graduates who are working in the industry because they understand both the curriculum and the industry,” O’Neill said.

Interactive Development

The Brookings report also includes recommendations to involve stakeholders in training development. The report suggests that since water workers are required to maintain continuing education units, utilities and other water employers should provide additional frameworks and “develop competency models – or customize existing models – to promote continued learning and skills development among staff.”

Tasks associated with this development include defining and measuring types of knowledge, skills, and abilities needed among water workers within the organization. The report also recommends creating more robust programs to introduce younger, non-traditional workers to the water sector to acquire hands-on experience.

Goodburn noted that the success of the apprentice program is based on supporting staff and operators at each level of their career and providing training and opportunities to move upward.

“One of things we were successful at was developing people in their careers,” Goodburn said. “I used to tell my staff – and it would freak them out – ‘I want you to work yourself out of your job every five years, but I want your new job to be here, with us, at Littleton/Englewood.’”

“I think that’s philosophically what the management was looking for: those people that really wanted to reach, grow, and really make a career out of it, not just a job. I think that has really been the success in the apprentice program and throughout the rest of the organization because people do have the opportunity to grow.”

Katherine Saltzman is a publications assistant at the Water Environment Federation (Alexandria, VA), where she works on WEF’s Operator Initiative programs. [@ktsaltzman](#)

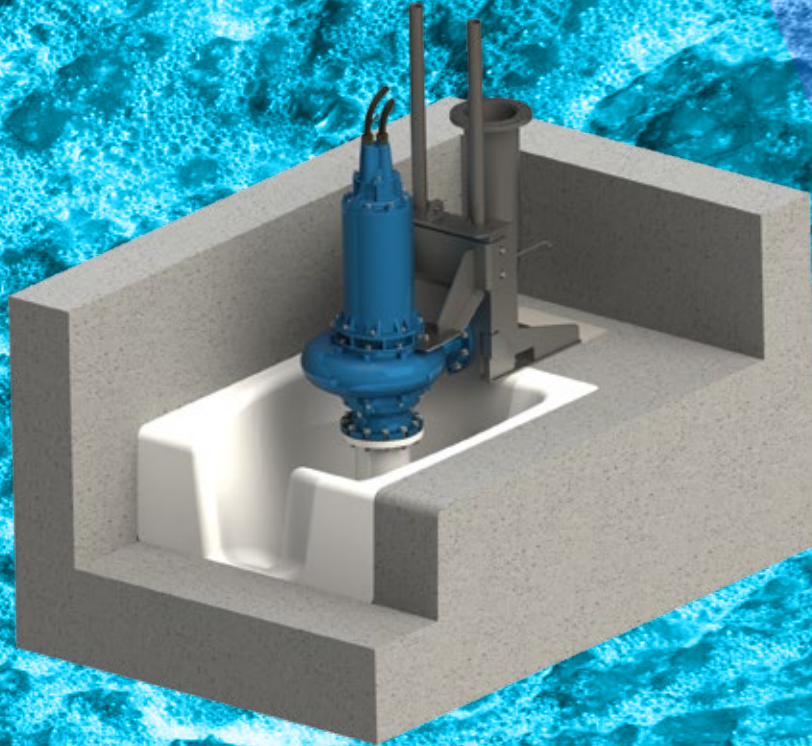


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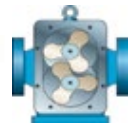
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