SPRING
2019

The Official Publication of the Water Environment Association of Utah

DIGESTED news

Celebrating 50 Years of Clean Water

MICROPLASTICS
in Wastewater Treatment Plants

Snyderville Basin Water Reclamation District
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INSIDE:

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Harley Davidson DCP Case Study

The Challenge:

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

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

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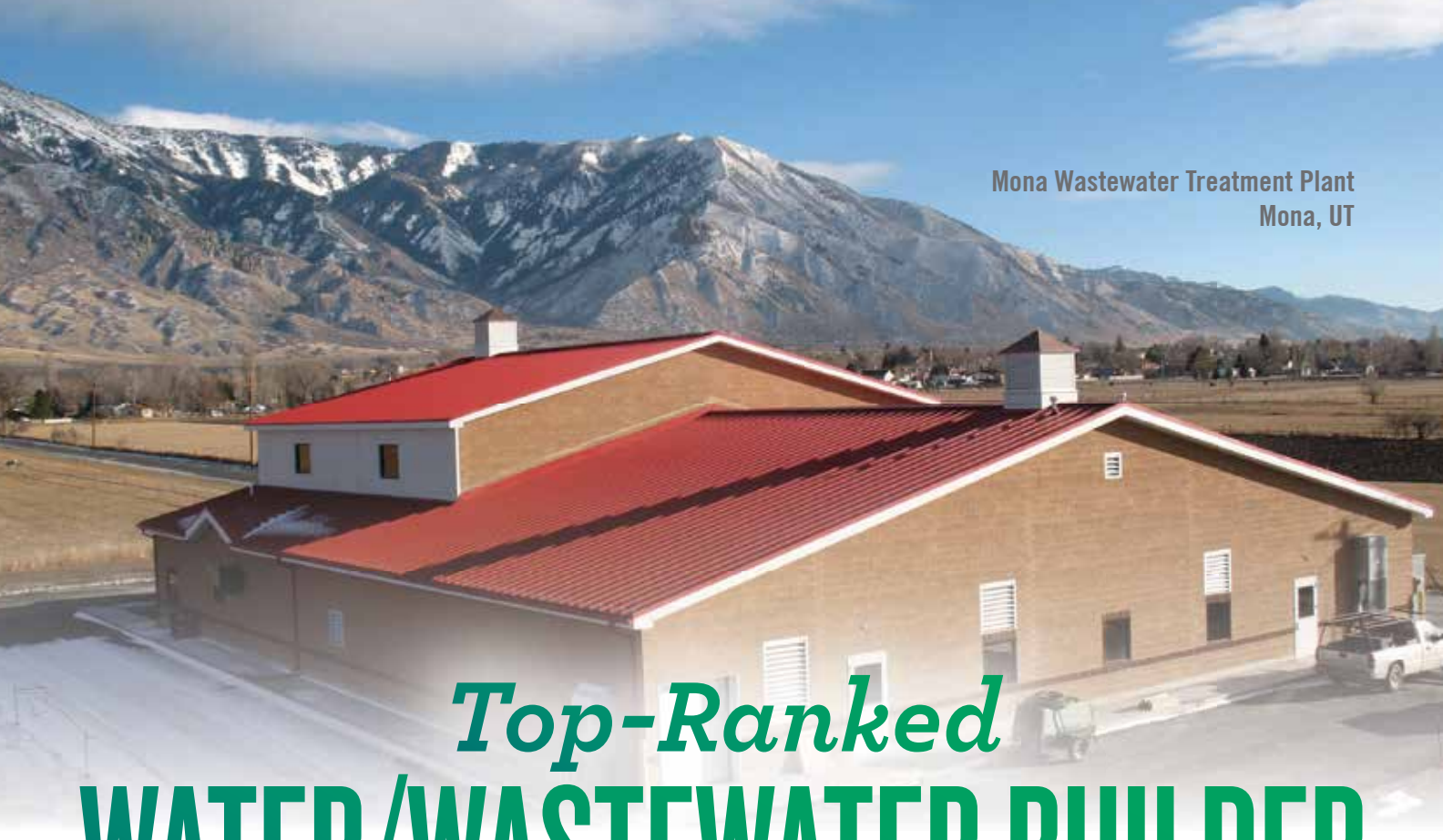

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FEATURES

Departments

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Passing the Golden Shovel


Jeff Beckman

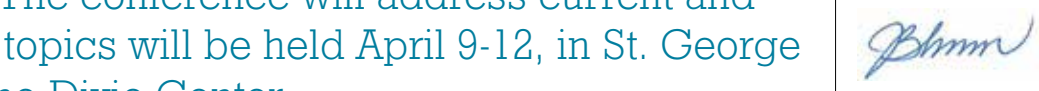
I can't believe it is almost time for our annual conference again. When I was a kid, a week seemed like a long time and the summer break seemed like eternity. But now a day or a year can go by incredibly fast. But that does not stop our Conference Committee. They have been hard at work preparing another great program full of great opportunities to learn and share. Our Committee has prepared a conference that addresses current and hot topics, which will be held April 9-12, in St. George at the Dixie Center.

The conference will start on Tuesday with the preconference session titled, *Workforce Challenges for Employers and Employees.* This topic is timely for our industry, as all areas of our industry are struggling to find and keep good employees. This session will be an interactive discussion of the challenges faced by both employers and employees, led by leaders in the workforce management, recruiting, and employees support industry. The following days will be filled with technical training sessions with topics ranging from innovative technologies, operations, regulatory changes, management, to collection system improvements. In addition, the operators challenge is one of the highlights of the conference. Don't forget the golf tournament, skeet shooting, operators BBQ and other fun events.

I can't thank our conference committee enough. Many volunteer hours are donated to ensure that the conference runs smoothly while providing valuable training for the association members. We hope to see you in St. George.

> "The conference will address current and hot topics will be held April 9-12, in St. George at the Dixie Center.

The Annual Conference is also the time that I will pass the golden shovel (that of the WEAU President) to Giles Demke. This last year has been a great learning experience for me. I have come to greater appreciate the many hours that are volunteered or donated that go into running WEAU. I have come to learn that there are many people serving on committees, who are working to forward our industry on a daily basis. Many times, these people serve without much fanfare or recognition. They serve because they want to help others to become better, because they want to help the environment, because they enjoy the friendships that have developed through their work, and because they are good people. It has been a privilege to get to know many more of the good people of WEAU. Thanks for all you do! I look forward to continuing to serve and develop more friendships with you all. DN



Jeff Beckman, WEAU President

And Snow It Goes

Chad Burrell

It's Valentine's Day and I got up at 5:30 am this morning to move about a foot of snow that fell during the night, after moving about that much snow last night before bed. Does my wife need any more of a Valentine's Day gift than that? I am so romantic! I have lived in Kamas for almost five years and have become accustomed to doing snow removal, but this year is an exceptional one. I use an old John Deere tractor for my snow removal – to clear my driveway and farm yard – and as much as I complain about snow removal and my old worn out equipment, I know the snow is much needed and I look forward to drinking water this summer and seeing the reservoirs full. I hope you enjoy this issue – we have all the information for the upcoming Annual Conference in St. George in this edition. There are also many positions on the WEAU Board that are due for a change, you will find the bios for all of those individuals that are up for these positions. We look forward to their leadership and I hope to see you all in St. George in April, with (hopefully) no snow. DN

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2019 Rocky Mountain Chapter NASTT

Sporting Clay Event

Tuesday, April 9 at 3:30pm
Purgatory Clay Sports

$20/person, includes 50 targets & 50 shells

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What you will need

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Clothes: Wear good shoes/boots that will allow you to walk the course in comfort. We discourage the use of sandals. Comfortable clothes that allow you free movement are best.

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Registration

http://www.rmnastt.org/events-education.html

Watch the video and fill out the disclaimer here

http://purgatoryclays.com/safety

Contact Mike Kobe for more information, 801.316.9818, mkobe@brwncald.com

YOU'RE INVITED 2019 WEAU Annual Golf Tournament

Format: Four-person scramble
When: Tuesday, April 9, 2019
Where: Sunbrook Golf Course, St. George, Utah
Green Fees: $50.00 per person (includes cart and lunch)
Lunch: Box lunches & drink provided (available at 12:00 PM)
Contact: Jeff Beckman, Bowen, Collins & Associates
154 East 14075 South, Draper, UT 84020
801.495.2224 I *jbeckman@bowencollins.com*

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

Contact Jeff Beckman at (801) 495-2224 with questions.
We will match single players to fill foursomes.

REGISTRATION FORMS AND FEES ARE DUE BY MARCH 29TH, 2019.

Name	Phone

TECHNICAL PROGRAM SCHEDULE

Wednesday, April 10

	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
8:30–12:00	State of Utah Water Quality Board Meeting – Garden Room						Operator Challenge Ongoing Exhibits Open
Session A	**Sunbrook A**	**Sunbrook B**	**Sunbrook C**	**Entrada A**	**Entrada B**	**Entrada C**	**Exhibit Hall**
	Utility Management	Pretreatment	Public Outreach	Collections	Nutrients	Biosolids	
	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	
1:30–2:05	Integrated Stormwater and Wastewater Planning – Approaches, Case Studies and Innovations *Jeff Den Bleyker*	DEQ Meet and Greet	An update on the Utah Lake Water Quality Study (ULWQS) *Scott Daly/ Mitch Hogsett*	Temporary Sewer Flow Metering *Chris Slater*	Phosphorus Removal and Struvite Control at Fort Worth's Village Creek WRF Using Peroxide Regenerated Iron Technology (PRI-Tech) *Ian Watson*	THP Without Steam or Chemicals *James Goldhardt*	Exhibits Open
2:10–2:45	Construction Cost Escalation, Labor Shortages, What's an Owner to do? *Glen Perry/Phil Heck/ Trevor Lindley*	Pretreatment Communication *Jennifer Robinson*	Utah's Approach to Stem the Tide of Cyanobacteria Dominating our Waterbodies *Ben Holcomb*	Wastewater Regionalization in Northern Tooele Valley *Benjamin Miner*	Optimization and Troubleshooting of Existing Treatment Processes to Achieve Low Effluent Phosphorus in WRFs *Prithviraj Chavan*	Employing Caldicellulosiruptor bescii (C. bescii) to Digest Recalcitrant Biomass *David Parry*	Exhibits Open
2:45–3:30	Break – Exhibit Hall						
	Sunbrook A	**Sunbrook B**	**Sunbrook C**	**Entrada A**	**Entrada B**	**Entrada C**	**Exhibit Hall**
	Asset Management	Project Delivery	Public Outreach	Collections	Nutrients	Biosolids	
3:30–4:05	Asset Management, Where Do I Start? *Michael Fuss, P.E.*	CMAR Case Study for the Mona Wastewater Treatment Facility *David Fagerstrom*	Storm Water Permit Requirements for POTWs *Lisa Stevens*	Shake it Up Baby *Lonn Rasmussen/ Mike Foerster*	Advancements in Nitrogen Removal from Tertiary Wastewater *Kirsten Sims*	Sludge, Biosolids and the Wasatch Front *Mitch Hogsett/ Nick Patterson*	Exhibits Open
4:10–4:45	Getting It Right the First Time: CMMS Selection and Implementation *Ben Skousen*	Drone Inspection and Documentation of Projects *Kevin Gallagher*	Numeric Nutrient Criteria for Utah's Headwater Streams: Application of Stressor-Response Models and Multiple Lines of Evidence *Jeffrey Ostermiller*	Laser Profiling for Assessment and Rehab of Concrete Sewer Pipe *Sean O'Rourke/ Steven Meyer*	Nitrogen Management in Treatment of Complicated Urban Waste-streams *Aditi Podder*	What Does a Resilient, 'Future-Proof' Biosolids Program Look Like? *Chris Muller*	Exhibits Open

Thursday, April 11

Session B	**Sunbrook A**	**Sunbrook B**	**Sunbrook C**	**Entrada A**	**Entrada B**	**Entrada C**	**Exhibit Hall**
	Public Outreach	WWTP Design	Sustainability	Collections	Nutrients	Safety/Laboratory	
	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	
8:30–9:05	USEPA Headquarters – A Life Cycle Assessment (LCA) of Nutrient Removal Technologies in Wastewater Treatment Plants *Mario Sengco*	From Oxidation Ditches to MBR: Using Simulators to Guide the Decision Making Process *Mengli Shi*	How Much is Your Digester Gas Worth *Peter Zemke*	Digital Side-Scanning Technology Increase Production and Return on Investment *Matt Olson*	Rare Earth Chemistry for Phosphorus... Why All the Excitement? *Jason Hock*	Lab Prep for WW Treatment Test Grade I and II *Aimee Matthies*	Exhibits Open
9:10–9:45	Utah State Revolving Fund Outlook in 2020 – 2025 *John Mackey, PE*	How Can a Flexible Process Benefit My Facility? *Kevin Hall/James Dixon*	How SURE? Sustainability and Resiliency for Conventional Filters and Underdrain Systems *Stuart F. Humphries*	How to Clean and CCTV Sewer and Storm Systems *Sheldon Teeples*	Onsite VFA production to Support Simultaneous EBPR and Denitrification Role of Novel Paos *Brendan Mackey*	Seismic Bracing of Piping Systems *Artak Mirzoyan, P.E.*	Exhibits Open
9:45–10:30	Break – Exhibit Hall						
	Sunbrook A	**Sunbrook B**	**Sunbrook C**	**Entrada A**	**Entrada B**	**Entrada C**	**Exhibit Hall**
	Misc WW Topics	WWTP Design	Sustainability	Collections	Nutrients	Operations	
10:30–11:05	Extreme Water Recycling - Direct Potable Reuse in the US *John Richardson*	History of Water Service Line Materials *Whit Hall*	Saving Energy and Money through Better Wastewater Treatment Plant Mixing *Michele Braas*	Bio Augmentation - How Technology has Changed the Game *Gregory Page*	Carbon Management Strategies for Wastewater Treatment Plants *Brittany Radke*	The Evolution of the Operator: Past, Present and Future *Sharon Burton*	Exhibits Open
11:10–11:45	Clearing the Hurdle – A look at the South Valley Sewer District, Jordan Basin WRF Membrane Basins Rehabilitation Project *Greg Hansen*	Owner Flexibility in Equipment Selection *Jake Baer*	Water Reuse Alternatives Analysis for Cedar City *Cory Dow*	Acoustic Assessment of Collections Systems *Bob Borden*	Ammonia Limits and Lagoons: The Options Available for Beating Nutrient Limits *Dalen Crouse*	Tale of Three Cities *Paul Krauth*	Exhibits Open

Thursday, April 11

Session C	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	Misc WW Topics	Innovative Equipment	Misc WW Topics	Collections	Nutrients	Operations	
	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	Moderator – TBD	
1:30–2:05	Solids Reduction for Waste Water Applications *Jon Neuenschwander*	Centrifuge Scroll Design Innovation *Alexius Emejom*	Using High Frequency Dissolved Oxygen Data to Assess Rivers and Streams *Marshall Baillie*	Large Diameter Sewer Rehabilitation Using Sliplining and Cured-In-Place Pipe (CIPP) *Mike Kobe*	Economic Analysis of AirPrex® Technology for Removing Orthophosphate and Improving of Dewaterability of Digested Sludge *Zachary Mazur*	Validation of Water & Wastewater Quality Measurements, Plant Data and Process Management *Steve Myers*	Exhibits Open
2:10–2:45	Cyanotoxin Impact on Microbial-Mediated Nitrogen Transformations in Lake Environments *Marielle Hollstein*	Rolling with the Punches of Greenfield Design – How Logan City Stayed in the Ring *Ryan Bench*	Utah Sewer Management Program (USMP) *Leanna Littler*	Subsurface Utility Engineering *Elisha Ritchie*	Biological Phosphorus Removal Retrofit at the 220 MGD RWHTF *Chris Machado*	So, You Want an Online Process Monitoring System for your Nutrient Removal System? There are 5 Questions You Need to Answer *Robert Smith*	Exhibits Open
2:45– 3:30	Break – Exhibit Hall						
	Sunbrook A	Sunbrook B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	Misc WW Topics	Innovative Equipment	Misc WW Topics	Collections	Nutrients	Operations	
3:30–4:05	Next Generation Design and Operation of Primary Sludge Fermentation Reactors *Dru Whitlock*	Innovative Technology and Collaborative Delivery Working Together *Nathan Antonneau*	Multi-Port Mixing Systems for Wastewater Treatment *Dan Richards*	Understanding Geotechnical Reports *Jon Hanson*	Bacterial Protein Production as a Sustainable Means to Recover Ammonia Nitrogen from Liquid Waste Streams *Bishav Bhattarai*	Process Control Methods and Tools for Meeting Effluent Nutrient Limits *John Gallagher*	Vendor Breakdown
4:10–4:45	Impact of Upgraded Polymer Mix/Feed on Sludge Dewatering Two Case Studies *Dr. Yong Kim*	Moab Uses 'New' Treatment Technology *Robert Mayers*	Molecular Method Applied for the Identification of Microcystinproducing Species in Utah Lake *Hanyan Li*	Dealing with an Angry Public *Dianne Olson*	The Selection of Advanced Biological Nutrient Recovery for Phosphorus Compliance at Two Wisconsin Facilities *Brian Richichi*	Real World Considerations for Pump Design, Operation and Troubleshooting *Steve Truitt, PE*	Vendor Breakdown

Friday, April 12

Session D	Sunbrook A and B	Sunbrook C	Entrada A	Entrada B	Entrada C	Exhibit Hall
	Utility Management/DWQ Update		Operations	Collections		
	Moderator – TBD		Moderator – TBD	Moderator – TBD		
8:30–8:55	WEFTEC Design Competition Student Paper Presentation *Winning Team*	Closed	Closed	Closed		-
9:00–9:40	Water Quality in Utah and You *Leland Myers*	Closed	Development of a New Aeration Control Method for Membrane Bioreactors *Brian Codianne*	Viable Trenchless Alternatives to Open-Cut *Mike Ellis*		-
9:45–10:25	Utah Water Quality Division Updates *Erica Gaddis*	Closed	Process Challenge Exam Review *Paul Krauth*	Perfect Pipe, Manholes and Jacking Pipe *Heather M Christensen*		-
10:30–11:15		Closed		Collection System Jeopardy *Mike Foerster*		-

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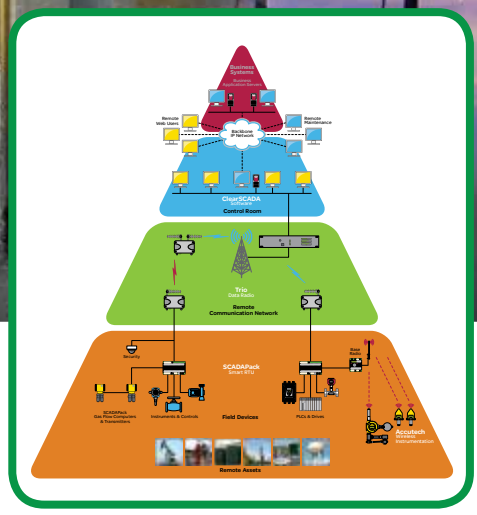

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WEAU 2019 GENERAL ELECTION REMINDER

Elections for the 2019 WEAU Board will be online.
For ballot information, visit *www.weau.org*.

WEAU 2019 ELECTION BALLOT

EXECUTIVE COMMITTEE
Jeff Beckman, Past President
Giles Demke, President
Chris Reilley, President–Elect
Trevor Lindley, Vice President*
John Richardson, Treasurer
Chad Burrell, Secretary*

DIRECTORS
Rob Jaterka, Director
Sarah Leavitt, Director
Marianna Sochanska OR
Brandon Wyatt, Director
Jed Jenkins OR
Jeremy Jensen, Director

WEF DELEGATES
Sherry Sheffield, Delegate
Mike Foerster, Delegate

PWO REPRESENTATIVES
Clay Marriott,
New PWO Representative*
Tyler Barfuss OR **Jordan Probst**,
PWO Representative Elect

Note: **bolded** names are running for office
* = Running unopposed

Jeff Beckman
Past President

It has been a pleasure to work with the WEAU Board these past few years. A lot of time and effort is spent throughout the Association in an effort to protect the environment. From the training to the conferences and everything in between, it is all volunteer work. It has been a privilege for me to see the amount of effort that is spent on a daily basis in support of WEAU. It is the members that make WEAU such a great organization. It has also been a privilege as I have been able to get know many of you as we have served together. Our Association is in good hands. I look forward to supporting the President and Board members as the Past President.

Giles Demke
Candidate, President

Giles began working in the wastewater industry over 22 years ago. He has worked on both sides of the aisle, beginning his career in the consulting field as a draftsman and becoming Construction Manager. Then, 13 years ago switched to the municipal side as a Project Manager for a wastewater treatment plant where he obtained his Grade IV Wastewater Operator certification. His current position is that of Wastewater Section Manger for the City of Orem. Over the past seven years he has had the privilege of serving as a volunteer for WEAU, serving on the board starting as Secretary. Giles is also serving as a member of the Utah Wastewater Certification council and participates on the Mt. Olympus Improvement District and Central Valley Water Reclamation Facility boards.

Chris Reilley
President-Elect

Chris Reilley has been at CVWRF for over 23 years, gaining versatile experiences, which helped him develop a well-rounded presence in the industry. Chris has been a parts runner, utility worker, control room operator, belt filter press operator, industrial mechanic, industrial mechanic supervisor, and is currently working as the Maintenance Manager at CVWRF. He completed his Apprenticeship and AAS Degree as a Facilities Maintenance Technician at Salt Lake Community College, and passed all the Operator and Maintenance Certification Exams.

Chris has been very involved with the WEAU as both a participant and as a strong supporter of the Operations Challenge

Chris Reilley *continued*

on a local and a national level. He has been on the WEAU Board as the PWO Representative and also as a Director for three terms. Chris has helped operators prepare for certification exams and helped both teams and individuals in the Operator Challenge events. He can be found serving his community by scouting, umpiring, and serving in local church activities.

From Taylorsville, Chris currently lives in Grantsville with his wife and five children. Chris enjoys sport activities, being in the mountains, and the great outdoors. His true passion and drive is his family and he finds great enjoyment helping others learn and understand the value of water and the industry that we serve.

Trevor Lindley

Candidate*, Vice President

Trevor Lindley is a Project Manager and Project Engineer with Brown and Caldwell in Salt Lake City. He has been working in the field of Environmental Engineering ever since graduating from Utah State University in 1996. After spending seven years away from Utah – including time in Ohio and Arizona – he returned to Utah in 2006 and has been actively involved with the industry and WEAU ever since. Trevor first worked with the WEAU website for two years, conference technical chair for three years, and is now in his third year as the annual conference chair. Trevor enjoys his work as an environmental engineer. He mostly enjoys seeing projects come together and teaching city councils, board members, and average citizens how water and wastewater treatment works and why it's important. A love of the outdoors, particularly fly-fishing, and a good high school AP Biology teacher started him on the path that he is on today. In his committee chair assignment, he really appreciates all the volunteers who quietly work behind the scenes to move WEAU forward. Trevor and his wife Tiffanie live in Mountain Green Utah and are doing their best to raise four pretty awesome kids: Tyson, Emma, Ashton, and Brandon.

John Richardson

Treasurer

Mr. Richardson is a project manager with Carollo Engineers, Inc. with 19 years of experience that includes facility planning as well as design and construction of industrial, municipal, federal treatment, and infrastructure facilities. He has a BS in Environmental Engineering from Utah State University and an MS in Civil Engineering from the University of Utah. He has published peer-reviewed papers on anaerobic digestion and is a licensed Professional Engineer in Utah, Nevada, and Idaho. Mr. Richardson has also enjoyed serving on the WEAU Biosolids Committee for over seven years. He has had the opportunity to work on a broad range of projects for facilities ranging in size from 100,000 gallons-per-day to over 100 million gallons per day with construction costs ranging from $1M to $100M.

He has been married to his wife Bonnie for 19 years who is a biochemist and project manager for an international pharmaceutical company. They have four children and reside in Draper, Utah, where they enjoy outdoor activities including snow skiing, hiking, and camping.

Chad Burrell

Candidate*, Secretary

I have been involved in 'wastewater' my whole life – if you count my years in diapers, my years getting potty trained as a toddler, and then my parents having to put up with all my crap as a teenager. Unfortunately, only half of my life in 'wastewater' involved me being financially compensated for my work. I was hired on by Orem City Water Reclamation when I was still in college studying Environmental Technology and Business Management. At Orem I worked various positions in Operations, Pretreatment, and Biosolids. After almost 15 years with Orem I was hired by Snyderville Basin Water Reclamation District, where I have worked in Pretreatment and am now the Operations and Safety Manager for the District. I have worked there for five years and enjoy it very much. I have served in various roles in the WEAU – on the Biosolids Committee, as the PWO Representative, and as the editor of the Digested News (since Winter 2011). Anything that I consider to be a successful accomplishment I credit to my very supportive wife, along with my daughter and four sons. When I am not at work, I am at home-at work, on our small farm in Kamas where we love to raise livestock and do things together outdoors as a family.

Marianka Sochanska

Candidate, Director

Marianka Sochanska, PE, is a Senior Staff Environmental Engineer with Brown and Caldwell. Her portfolio of work encompasses a wide variety of water and wastewater design and construction projects, including civil, mechanical, and process work. Her project experience also includes collections system engineering, water resources planning, and resource recovery projects. She has served as the Water Environment Association of Utah (WEAU)'s Young Professional Committee Chair for the last three years and was recognized as the *Young Professional of the Year* in 2016. Her passions include the outdoors, spending time with her horse and dog, and skiing.

Brandon Wyatt

Candidate, Director

Brandon Wyatt is a Principal Wastewater Engineer with Bowen Collins & Associates (BC&A) in Draper, Utah. He was raised in Las Vegas, NV and attended Utah State University where he earned his bachelor's and master's degrees in civil and environmental engineering. His early career included stints as a laborer, framer, telemarketer, surveyor, and draftsman.

Brandon has worked for BC&A for 11 years primarily managing and designing wastewater projects. His nearly 20-year career has provided him with a background in development, site civil design, structural design and wastewater engineering. When he's not at work, he enjoys the outdoors and his family. He's most happy when he can combine the two in family camping, hunting, or fishing trips.

Brandon joined WEAU and was recruited to join the Mid-Year Conference Committee in 2014 and for the last three years he has had the opportunity to be the Committee Chairman. His favorite part of WEAU is getting to meet all the great people in the industry and he is constantly amazed at the dedication, skills, and talents the many professionals who are part of the organization. He is excited for the opportunity to continue to work in the organization, this time as a board member. As part of the Board of Directors, Brandon hopes to provide support and encouragement to other WEAU programs, encourage more participation and continued opportunities to build relationships.

Jed Jenkins

Candidate, Director

Although I am new to the wastewater industry, I am extremely excited to be here. I have been working for Goble Sampson for one and a half years now and I am thoroughly enjoying working in the industry. Previously, I was in the environmental sector for 10 years as a laboratory geologist. I received a Bachelor's Degree in geology from Weber State University in 2008.

I currently live in Plain City, Utah with my wife and two sons aged seven and 10. I spent a few years in Wyoming as a child but have been in northern Utah ever since throughout my adult life. As a family, we enjoy spending time in the outdoors riding bikes, fishing, and hunting.

Jeremy Jensen

Candidate, Director

Jeremy Jensen has worked in the water and wastewater industry for the past 14 years in research, testing, consulting, and equipment sales roles. He developed an appreciation for water while working at the Utah Water Research Laboratory before completing his graduate studies in Civil Engineering at Utah State University in 2008. He is a licensed professional engineer in both Utah and Idaho and is currently a sales representative for isiWEST, serving the Utah and Southern Idaho markets for the past five years.

Jeremy has been active in multiple professional organizations, serving as president of the Northern Utah Branch of the Utah ASCE Section, member of three young professional committees in Utah and Idaho, member of the awards committee for the Pacific Northwest Clean Water Association (PNCWA), secretary/treasurer of the Southeast Idaho Operator Section of the PNCWA, and most recently as the membership engagement committee chair of the AWWA Intermountain Section.

Jeremy loves spending time with his wife and six children. Some of his favorite activities are skiing, swimming, and kayaking in the lakes and mountains near his home.

Clay Marriott

Candidate*, PWO Representative

I am currently the lead Collections Operator and grade IV Waste Water Treatment Operator at Central Weber Sewer Improvement District in Ogden, Utah, part of Central Weber's collection team, am currently updating the collections system. We use GPS surveying, cleaning, inspecting and perform regular maintenance to our collection system. I oversee the Storm Water Pollution Prevention Plan and have built a utility map for Central Weber. I am also a member of our plant chlorine and safety teams. I perform many maintenance projects and was responsible for the effluent project, which helped save significant energy costs. I studied Construction Management at Weber State University while working in the construction field for eight years. I was also able to work on a ranch for several years before I started my career at Central Weber. I enjoy challenges that arise in this industry and I thrive on finding solutions to these challenges.

This is my seventh year participating in Operations Challenge. I have competed on two national teams. The opportunities and lessons I have learned are priceless. The friendships I have made and cherish are the greatest asset of Operations Challenge. My wife Heather and I currently operate a small business that revolves around our family's love and passion for showing and raising animals. Together we are raising three busy kids, Stockton-13, Ridge-9, and Maysa-6. Life at the Marriott Ranch is always a wild ride and we wouldn't want it any other way.

Tyler Barfuss

Candidate, PWO Representative

I have worked in the wastewater industry for 12 years. I started my career as a treatment plant operator and have since moved to the collections department. I have participated in the Operations Challenge for nine years and attended the Nationals level four times. I am married with two dogs and we will be welcoming our first child in April. We like to go camping, fishing, and four-wheeling in our free time.

Jordan Probst

Candidate, PWO Representative

I am a Treatment Operator for Snyderville Basin Water Reclamation District. I have worked for Snyderville for just over five years, and being from Heber, am very grateful to work in beautiful Park City, where I rarely have to leave the mountains. I am a Treatment Operator IV and also certified as a Collections I Operator. I have been a part of the Operations Challenge for every year of my employment and enjoy the competitive nature of it very much. I love going to St. George and seeing all the many statewide operators I have come to know over the years. I also had the privilege of going to Chicago for Nationals in 2015 as a part of the Wasatch Allstars and had a great experience there as well.

In my free time, I love spending time with my wife and two kids. We moved from Heber Valley to Kamas Valley this past year and couldn't be any happier about our decision. I enjoy camping, hunting, fishing, and hiking. I am a huge sports fan and love watching Jazz games with my family. I am extremely happy to have found the wastewater industry and look forward to much more learning and growth at Snyderville.

Operating Strong

By Jeremy Deppe, PWO Rep.
deppej@cvwrf.org

Well, we just finished another great Midyear Conference and would like to thank all the presenters for their great presentations, organizing committees, and Brandon Wyatt. Brandon is pretty much the Master of the Midyear, and though this is Brandon's last year as the Midyear Committee chair, I am sure this won't be the last we see of him. Thank you Brandon for all that you have done and will do for the WEAU.

We also had a great year at Nationals in New Orleans. Our two Utah teams did very well. Our state champions, Central Weber Vortex, took first in Safety and first in the Pump Maintenance. They ended up 6th overall out of 48 teams in Division II. Next, we had the Wasatch All Stars. They also competed in Division II and finished 3rd out of 48 teams overall. They finished 3rd in the pump maintenance event. Congratulations and thanks to both teams, their entities, Central Valley, North Davis, Orem City, Cottonwood Improvement, Central Weber, Snyderville Basin, and the Board of WEAU for all their support.

We will be having our Operators Challenge Kick Off meeting at Central Valley Water Reclamation Facility on December 6th, at 11 am, so please send your teams. We will be discussing the events, the rules, picking the team numbers, and creating a practice schedule for the equipment. Bring your appetite, as we will be feeding the teams lunch. We hope to see you there.

The Annual Conference Committee is accepting abstracts for presentation at the 2019 WEAU Annual Conference to be held April 9-12, 2019 at the Dixie Center in St. George, Utah. All topics related to water quality, collection, treatment, compliance, utility management, or other related topics will be considered. Please visit *www.weau.org* for more details. DN

Operator Spotlight: Tyler Barfuss

By Clay Marriott

Tyler, also known as 'Stretch', started his career in the wastewater industry at the age of 18, working as a Treatment Operator for Central Weber Sewer for four years, before accepting a job as a Treatment Operator at North Davis Sewer District. At NDSD, Tyler worked as an operator for six years before accepting a position in the collections department. Currently he has accepted the responsibility as lead inspector for North Davis. Tyler credits most of his success in the sewer industry to the relationships he has built throughout the years and the networking opportunities. He finds great satisfaction and joy in his job is now when he gets to be involved. Tyler enjoys working with great people and finds satisfaction in working with the public and general contractors as a collections lead.

His energetic personality, enthusiasm, hard work, and determination have allowed him to earn his Waste Water Treatment Four, Collections Four, and Maintenance Technologist Three certifications.

When asked what advice he would give to a newcomer in the industry, Tyler suggests that "you are responsible for your own success, take every opportunity given and be responsible for every challenge you are given."

Tyler's coworkers describe him as a jokester that can be serious when he needs to be. One of his favorite relaxation activities is go to the sand dunes with his family and his dogs. He is the proud father of five – dogs: Rowdy, Ruckus, Truck, Camaro, and Banshee (in that order). However, in April will he will become a first-time father with his high school sweetheart and wife Jordan. Tyler can often be heard singing along to songs on the radio, making his own parody as he goes.

He has participated in the Operators Challenge eight times and has gone to Nationals four times. Tyler is always a fun person to be around and always does a great job in all that he is involved in, he is one of the PWO representative elect this year. I have enjoyed competing and working with Tyler. DN

What About Sludge Age?

By Paul Krauth

So, what is Sludge Age, versus the MCRT, versus the SRT, or versus the oSRT? How do you know which one matters, and why should you care?

For those of us who have been in the industry for few years, we have noticed an explosion in new technologies and terms. As new terms are added they often replace a term what has be in use for years. But many terms have fallen out of use. Anyone calculating ***Gould Sludge Age*** lately?

Sludge Age is a catch all phase referring to the amount of time the bacteria spend in the activated sludge system.

The things you need to know to calculate any sludge age include:

1. MLSS in the entire aeration tank(s) and their volumes.
2. MLSS in the clarifier(s) and their volumes.
3. TSS in the effluent and the flow rate.
4. MLSS in the waste and the flow rate.

There are three common terms that are used to describe this time.

MCRT (mean cell residence time) is the truest of the equations to represent the average time the bacteria spend in the system. But to do this calculation you need to know all four variables.

$$MCRT = \frac{\text{mass in the entire aeration tank(s) + mass in the clarifier(s)}}{\text{mass wasted daily + mass lost in the effluent}}$$

Often clarifier(s) are not routinely sampled for MLSS.

SRT (solids retention time) is the simplest of the equations to represent the average time the bacteria spend in the system. But to do this calculation you only need to know three variables.

$$SRT = \frac{\text{mass in the entire aeration tank(s)}}{\text{mass wasted daily + mass lost in the effluent}}$$

This is often the equation used to estimate SRT, but be aware that will underestimate (possibly up to 50%) the actual sludge age of the bacteria.

oSRT (oxic solids retention time) is another simple equation to represent the average time the bacteria spend under aeration in the system. To do this calculation you need to know three variables.

$$oSRT = \frac{\text{mass in the entire aeration tank(s) x percentage under aeration}}{\text{mass wasted daily + mass lost in the effluent}}$$

So, which one is important?

Typically, the sludge age is calculated to achieve permit compliance. If ammonia removal (nitrification) is a permit requirement, then the oxic SRT should be control sludge age. The ammonia oxidizing bacteria (AOB) are strict aerobes and cannot function without dissolved oxygen. Hence only the bacteria (mass) under aeration are responsible for nitrification. The minimum sludge age for nitrification (oSRT) depends on the dissolved oxygen, the pH, and the water temperature in the aerated zone.

While all calculations require knowing the mass wasted and lost in the effluent.

Chart A shows the samples need to calculate each sludge age.

You can learn more about sludge ages and impacts by accessing the WEF's On-Demand Wastewater Library at *www.wef.org/resources/publications/owwls*, a free resource that is a benefit of your membership.

Thanks to Dr Sidney Innerebner, whose OWWL article was the inspiration for this article. DN

CHART A

Sludge Age	Anerobic zone	Anoxic zone	Aerated zone	Clarifier(s)
MCRT	✓	✓	✓	✓
SRT	✓	✓	✓	✗
oSRT	✗	✗	✓	✗

Test Your Knowledge on: Anaerobic Digestion

By Paul Krauth

1. **The solubilization large polymers to simple monomers is known as:**
   - A. Acetogenesis
   - B. Acidogenesis
   - C. Hydrolysis
   - D. Methanogenesis

2. **The breakdown of lipids typically produces which acid first?**
   - A. Acetic (CH_3COOH)
   - B. Butyric ($CH_3CH_2CH_2COOH$)
   - C. Proprionic ($CH_3CH_2CO_2H$)
   - D. Steric ($C_{17}H_{35}CO_2H$)

3. **What is the fate of Acetic acid in a functioning anaerobic digester?**
   - A. Acetogenesis
   - B. Acidogenesis
   - C. Hydrolysis
   - D. Methanogenesis

4. **Which class of bacteria are found in a standard rate municipal digester?**
   - A. Hyperthermophiles
   - B. Mesophiles
   - C. Psychrophiles
   - D. Thermophiles

5. **What is the biologic yield of carbon (as COD) in a functioning anaerobic digester?**
   - A. 5 – 15%
   - B. 20 – 30%
   - C. 35 – 45%
   - D. 50 – 60%

6. **When a suggested operational alkalinity range for an anaerobic digester?**
   - A. 20 – 35 mg/L
   - B. 200 – 350 mg/L
   - C. 2,000 – 3,500 mg/L
   - D. > 3,500 mg/L

7. **When a suggested operational volatile acids range for an anaerobic digester?**
   - A. 20 – 80 mg/L
   - B. 200 – 800 mg/L
   - C. 2,000 – 8,000 mg/L
   - D. > 8,000 mg/L

8. **An analysis of the digester gasses is done, which gas would indicate an air leak in the system?**
   - A. CH_4
   - B. CO_2
   - C. N_2
   - D. O_2

9. **Which gas will produce a yellow flame in the waste gas burner?**
   - A. CH_4
   - B. CO_2
   - C. N_2
   - D. O_2

10. **A rule of thumb to maintain a stable pH, the Alkalinity concentration should be _____ times the Volatile Acids concentration.**
    - A. 3
    - B. 5
    - C. 7
    - D. 9

ANSWERS:

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

Back It Up!

Provided by the WEAU Collection Committee and *www.mysafetysign.com/back-safety-quiz*

1. **Back injuries are the leading cause of work-related disabilities for people under what age?**
   - A. 25
   - B. 45
   - C. 55
   - D. 65

2. **Which of the following causes back injuries?**
   - A. Lifting objects incorrectly
   - B. Being physically unfit
   - C. Poor posture
   - D. All of the above

3. **Wearing a back belt is a proven way to minimize the risk of back injury at work.**
   - A. True
   - B. False

4. **If you wear a back belt, you can lift more weight than you could without a belt.**
   - A. True
   - B. False

5. **Which of the following should you NOT do while lifting objects?**
   - A. Keep the object close to your body
   - B. Keep your back straight
   - C. Bend at the knees
   - D. Keep your feet together

6. **Which of the following should you NOT do when lowering a load?**
   - A. Twist your body
   - B. Keep the load close to your body
   - C. Bend your knees
   - D. All of the above

7. **Which of the following should you avoid to reduce strain on your spine when sitting for long hours?**
   - A. Adjust your chair such that your feet are on the floor
   - B. Cross your legs at the knee
   - C. Place a seat wedge or a folded pillow under you
   - D. Take short breaks at least once an hour

8. **How should you lift objects from the floor when you are in a seated position?**
   - A. Bend and pick objects in a quick motion
   - B. Get up from the chair and bend to pick the object
   - C. Get up, move the chair out of the way, and squat to retrieve object
   - D. None of the above

9. **The NIOSH maximum recommended load weight to be lifted under ideal conditions is _____?**
   - A. 45 pounds
   - B. 51 pounds
   - C. 77 pounds
   - D. 85 pounds

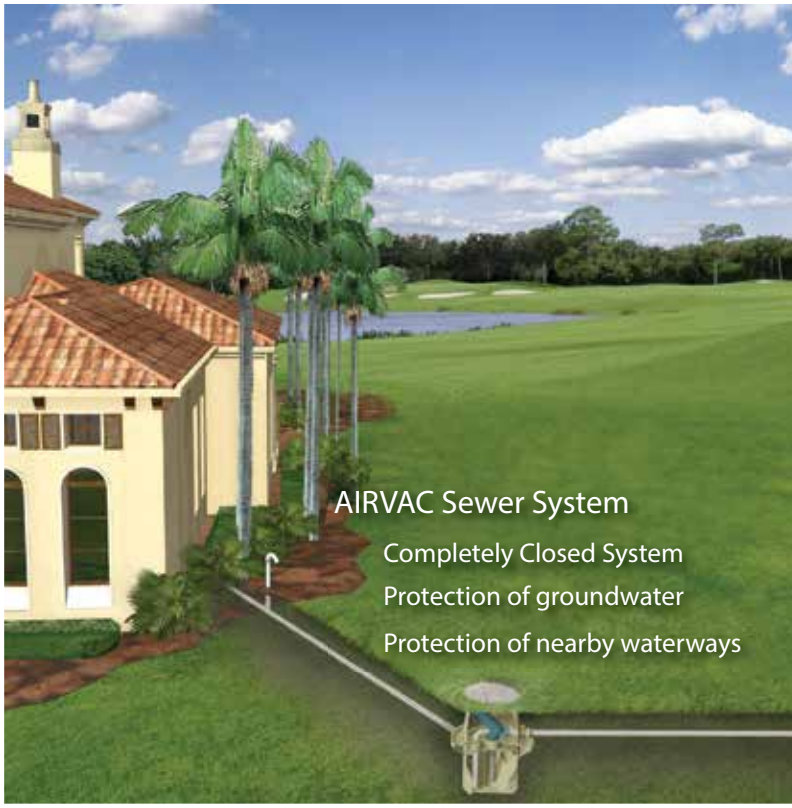
10. **Which of these sleeping positions is ideal to ease back pain?**
    - A. On your side, legs up toward chest, a pillow between legs
    - B. On your stomach
    - C. On your back with two hard pillows stacked under your head
    - D. On your side at a 45 degree angle

ANSWERS:

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

POLLUTION

SOLUTION



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Pharmaceuticals in Wastewater – Is There a Need for Pretreatment?

By Brett Nelson

About 10,000 pharmaceuticals with about 3,000 active ingredients are approved and marketed in the US. These and their reaction byproducts, reactants, and solvents can be present in waste streams that require treatment prior to direct or indirect discharges. Pharmaceutical production is a major portion of the chemicals manufacturing industry – in value and product diversity, if not in gross tonnage. Because pharmaceutical chemicals are designed to be biologically active, it is not surprising that disposal of their production waste products into the environment receives particular regulatory scrutiny in many countries. That could be one of the reasons why many pharmaceuticals are now manufactured outside the US, usually in Asia under less stringent regulatory conditions; fewer regulatory controls contribute to lower production costs as well as additional contamination.

Pretreatment Requirements

The national pretreatment program is part of the National Pollution Discharge Elimination System (NPDES) and is a cooperative effort of federal, state, and local environmental regulatory agencies to protect water quality. It is delegated to state, tribal, and territorial governments. They perform permitting, administrative, and enforcement tasks for discharges to surface waters (NPDES program). Pretreatment requirements are intended to protect publicly owned treatment works (POTWs) and other sewage treatment systems and to reduce conventional and toxic pollutant levels discharged by industries and other nondomestic wastewater sources into municipal sewer systems and the environment.

The program requires nondomestic dischargers to comply with pretreatment standards to prevent the introduction of pollutants into a POTW that will interfere with its operation, prevent the introduction of pollutants into a POTW that will pass through into waters of the US, causing a violation of an NPDES permit or otherwise be incompatible with it, and improve opportunities to recycle and reclaim municipal and industrial wastewater and sludge.

There are specific discharge standards and requirements that apply to sources of nondomestic wastewater discharged to a POTW. Reducing or eliminating waste at the source results in fewer toxic pollutants discharged to and treated by the POTWs and perhaps escaping into receiving waters. Pretreatment standards include general and specific prohibitions, categorical pretreatment standards and local limits.

Pharmaceutical Manufacturing Effluent Guidelines

Effluent guidelines are detailed specifications and regulations that apply to facilities in five subcategories: fermentation products, extraction products, chemical synthesis products, mixing/compounding and formulation, and research. Pharmaceuticals are addressed in 40 CFR Part 439. Examples of major components of Effluent Guidelines include the following by section:

- 439.12 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT)
- 439.14 Effluent limitations attainable by the application of best available technology economically achievable (BAT)
- 439.15 New source performance standards (NSPS)

Self-Assessment Tool

The Effluent Guidelines are broad and complex sets of requirements that pervade many aspects of pharmaceutical production and processing. The EPA has produced a 'Process-Based Self-Assessment Tool for the Organic Chemical Industry' (US EPA, 1997) with the aim of providing some level of rationality to assist industry managers and decision-makers. It is intended to help industrial facilities implement a comprehensive environmental management system (EMS) plan tailored to the specific processes and facility so they can plan and operate in the most efficient mode to cope with compliance demands for the myriad requirements. These include self-assessments as part of the EMS to identify integrated and potentially more cost-effective means of achieving compliance. This version is from 1997, so there might be some later revisions available, but they should be fundamentally consistent.

Conclusion

Pharmaceutical manufacturing and many other industrial segments are covered by the many Pretreatment Requirements and Effluent Guidelines developed by the industrial category. They address an important need to control harmful discharges, and they represent a major technical and operating challenge – to be aware of all regulations and to assure they are met in an economically reasonable manner so NPDES permits will not be violated. DN

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Microplastics in Wastewater Treatment Plants – A TOTALLY PREVENTABLE SOURCE

At the recent, *Sixth International Marine Debris Conference* (March 12-16, 2018, San Diego, CA), the problem of microplastics was a major topic, one of great interest to anyone associated with wastewater treatment but particularly to wastewater treatment plants (WWTPs), as they put it. There are no current requirements on wastewater treatment plants (WWTPs) to address this issue, but it may be coming – something a person may see if they follow discussions at international conferences such as these. The title of the session was, *Microplastics in Wastewater Treatment Plants – A Totally Preventable Source.*[1]

Below are three of the session abstracts, as listed on their website.

Hrissi Karapanagioti, et al. wrote:
"Marine pollution by microplastics, plastic particles in the size range 1 nm to 5 mm, is a recognized emerging issue. Although they [wastewater treatment plants (WWTPs)] remove the solid waste arriving to their screens, they are not designed to remove microplastics. There are a few studies measuring the concentration of microplastics in the effluent. It seems that the concentrations are low but the actual amount ending up in the sea is quite significant. The present study is an extensive study surveying 101 WWTPs in various areas throughout Greece. Based on the results, the total amount of solid waste arriving to these 101 WWTPs is calculated equal to 3.7 108 L per week. Screens collect this amount but 94% of the WWTPs have screens with gaps larger than 5 mm. This suggests that microplastics are passing through preatreatment to the main WWTP.

Indeed, 89% of the WWTP managers observed microplastics anywhere in the plant. Cotton swabs are identified as the most common microplastic found in WWTPs and the surrounding marine and coastal areas of the effluent pipes. Informing the public as well as operators and engineers about this problem is necessary."[1]

Paul Helm, et al. wrote:
"Contamination by microplastic particles (MPPs) is well-documented in marine, and more recently, freshwater environments. Sampling in urban streams, wastewater effluents, and nearshore waters of the Great Lakes has shown that there are numerous types of MPPs entering the lakes. Typical reporting of MPP research and monitoring results includes the listing of abundances (counts per unit area, volume, or mass) and grouping of types of MPPs into broad categories such as fragments, film, foam, fibers, and pellets/beads. However, such broad categories may be insufficient for directing management actions for MPPs reductions and to measure the success of such actions.

We present morphological characteristics of MPPs, which can be used to expand their source-type categorization/classification. For example, rigid plastic particles resembling shavings, cuttings, and trimmings clearly generated by mechanical means, normally categorized as 'fragments', are indicative of commercial plastic activities. These 'commercial fragments' comprised a significant portion (>50%) of the up to 19 million MPPs/square km found in Humber Bay along the waterfront of Toronto, Canada. Our 2015 sampling of nearshore waters, streams and wastewater effluents in this region of the Great Lakes demonstrates the influence of more

"Marine pollution by microplastics, plastic particles in the size range 1 nm to 5 mm, is a recognized emerging issue. Although they [wastewater treatment plants (WWTPs)] remove the solid waste arriving to their screens, they are not designed to remove microplastics."

specific sources when detailed categories are used to characterize MPP profiles. Emissions of MPPs, likely from plastic product manufacture and recycling, are indicated to be a significant source to western Lake Ontario, and these findings form the basis for advice to resource managers regarding strategies to reduce to the occurrence of MPPs in the Great Lakes."[1]

Artem Dyachenko, et al. wrote:
"A regional effort to optimize sampling, extraction, identification and quantitation of microplastic particles in secondary Wastewater Treatment Plant (WWTP) effluent is presented. The study found that wastewater samples require special handling in order to remove inherent organic material-related interferences. Sequential wet peroxide oxidation (WPO) digestion leads to cleaner extracts with significantly reduced amounts of major wastewater related interferences such as cellulose and fatty acids. An attempt to count and type microparticles extracted from secondary wastewater effluent has been made and results were extrapolated using WWTP's average daily flow rates. Findings reveal significant discrepancy in microparticle count in extracts obtained from two hour sampling at peak flow and 24 hour composite sampling events.

The vast majority of microparticles could be categorized as fragments whereas pellets or beads appear to contribute less than 10% of the overall microparticle count. Many microplastic particles in wastewater are not homogenous with traces of other compounds present and visual microscopic identification alone is not sufficient in determining microplastics presence, which should be confirmed with an appropriate spectroscopic technique (e.g. micro-FTIR). Normal handling of some microplastic particles during analysis led to fragmentation, which could bias the final results. The need for a robust screening and quantitation of micorplastics with the tools accessible to wastewater laboratories and challenges of current methodologies are discussed."[1]

"89% of the WWTP managers observed microplastics anywhere in the plant."

From another angle the Nebraska Extension Educator Meghan Sittler recently answered a question that further shows these concerns.

Q: I recently read concerns about microplastics in municipal wastewater systems. Is that something I need to be concerned about in my own wastewater system?

Meghan: Microplastics are defined by the National Oceanic and Atmospheric Administration (NOAA) as 'small plastic pieces less than five millimeters in length' (that's about the size of a sesame seed). Microplastics can occur from larger plastic pieces that have broken a part, from residues used in other plastic products or increasingly commonly as microbeads, which are used in face scrubs, body washes or other personal care or household cleaning products. Plastics, other than a small percentage made of biodegradable material, do not readily break down over time.

Municipal wastewater systems are concerned about the build-up of these microplastics within their infrastructure used to treat and discharge wastewater. Similar concerns are valid for onsite wastewater systems. Depending on the size and amount of the microplastics as well as the components of your system, build up or blockage can occur, cause damage, and limit the functionality of your system. Additionally, the microplastics if included in the treated water discharged from your system, will enter the soil profile and can ultimately end up in groundwater or surface water resources.

A federal law, passed in 2015, bans the use of microbeads in personal care products by the end of 2019. However, it is a good idea to take stock of what products you may have in your home and consider purchasing microbead or microplastic free products to protect your system and the environment."[2]

Whichever way this goes, *Wastewater treatment plants (WWTPs)* are becoming more of the common language. We don't generate this waste, but as long as we are being looked as 'A Totally Preventable Source', we may need to give this issue a closer look.

[1] http://internationalmarinedebrisconference.org/index.php/microplastics-in-wastewater-treatment-plants-a-totally-preventable-source

[2] https://communityenvironment.unl.edu/water-q-microplastics-wastewater DN

ASLEEP AT THE WHEEL

Shift Work has Hazards Not Easily Seen

By Joe Freeman

Work schedules common to our industry involve ensuring productive, safe behavior from employees at times when other folks might be asleep or performing acts of 'real life' that involve self-awareness, emotional capacity, and attention to wellness. Shift workers, those that rotate or maintain work schedules outside of the nine-to-five norm often find it challenging to balance sleep and recovery cycles necessitated by off-'normal' work hours.

Nearly ¼ of all workers fill shifts that are not limited to the daytime, and more than ⅔ of these workers have problem sleepiness and/or difficulty sleeping (NHLBI, 2005). Workers might report more depression, family difficulties, lowered sleep quality and quantity, and chronic sleep deprivation, in which an employee might never 'catch up' on needed rest and recovery. Serious implications for health, productivity, and safety follow. Relatively constant symptoms of sleepiness and inability to concentrate affect our workers at unpredictable intensity, and the unrelenting pressure of maintaining sleep schedules, family life, and work responsibility might lead to mood or emotional impact, lack of energy and purpose, and impaired alertness.

Strategic assessment of successful work assignment must include a limitation of work schedules to provide sufficient time to an employee to sleep, recover, and prepare for continuing work requirements. Sleep deprivation might become cumulative when employees are reporting less than six hours per day, and affected by rotating schedules, differing light concentrations, ensuring restful

> "Workers might report more depression, family difficulties, lowered sleep quality and quantity, and chronic sleep deprivation, in which an employee might never 'catch up' on needed rest and recovery.

and uninterrupted sleep, and sensitivity to caffeine and stimulant use.

Shift workers might also face potential health problems, including ulcers, insulin resistance, and heart disease as their bodies deal with internal adjustments to their circadian rhythms that indicate when an individual might best be prepared to wake or sleep. Brain and eye sensitivity to environmental cues can be diminished or disrupted by night work, and the ability of an individual to focus or assimilate memories appropriately might be affected.

Those individuals who accept assignment for shift work should be monitored for situational alertness, sensitivity to surroundings and stimuli, and their ability to reasonably and effectively schedule their rest and recovery activities. Some employees undertaking shift work without preparation and discipline can contribute to a higher absenteeism or accident rate.

Training, equipment, and environmental controls can all be used to improve a worker's self-awareness and preparation for an off-hour work regimen. Electronic means that measure and report physical activity and metabolism rates are useful means of self-monitoring, and limitation or amplification of light can lead to better sleep or intensified cues of alertness and perception.

Overt schedule measures to limit recursive night shifts are suggested. The likelihood of exhaustion and chronic sleep deprivation falls when night work is limited in duration and repetition, and scheduled days off can contribute to recovery of normalized sleep patterns. Frequent schedule rotation can be limited or designed to limit sleep deprivation condition by directing a 'forward rotation' scheduling favoring circadian adjustments through a day-evening-night cycle that might ease sleep habit transitions. dn

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Jennifer Fulcher

Family of Utah Sheep Farmers Take a New Career Path

(Taken with permission from Water Environment Federation's Highlights, originally published on November 27, 2018)

After years of logging and sheep farming, Cody Snyder entered the wastewater sector. He may have started the career with simple expectations, but he developed a commitment to water that he has passed down to his oldest daughter, Jade.

"Truthfully, when I was 21, I was just looking for a job with good benefits," Cody said. "And I knew the treatment plant would be a good place to start."

When Cody took a job at the water reclamation facility (WRF) in Snyderville Basin Water Reclamation District (Park City, Utah), he did not know the event would mark the beginning of a lifelong career.

Cody is now a superintendent overseeing the district's two WRFs in a mountain resort community. During the past two years, a $50 million expansion and upgrade of the Silver Creek WRF has added complexity to the work. Ski season also contributes other challenges.

"Come winter, our float doubles with the added tourism, and the cold weather means the microorganisms [used to break down nutrients and organic materials] don't work as well," Cody said. "We have to double our counts to keep up."

Cody has developed a reputation for being expert in wastewater. The 23-year Water Environment Federation (WEF; Alexandria, VA) member has served as a judge in the Operations Challenge at WEFTEC and competed four times nationally with Utah's All-Star team.

Despite his national notoriety, Cody has not forgotten his roots in sheep farming. He remains active in his hometown of Peoa, Utah, where he raises sheep to show at 4-H events and manages land for the annual county fair. This is one way he stays close to his oldest daughter, Jade, who has entered sheep in 4-H competitions at the fair for the past nine years.

"My daughter also began showing an interest in engineering from a young age," Cody said. "I encouraged her to go into water because of its importance and necessity, and how interesting it is."

Cody Snyder (back right) and his wife, Dori Snyder (back left), attend a county fair with their three daughters where their sheep are shown. Photo courtesy of the Snyder family.

Jill, Cody, and Jade gather for a family picture. Photo courtesy of the Snyder family.

Jade (center) participated in the Water Environment Federation (WEF; Alexandria, Va.) Student Design competition at WEFTEC 2018. Her Utah State University (Logan) team – Todd Keniry, Ben Sandberg, Dominique Bertrand, Avery Holyoak, and Ryan Dupont – stand with 2018–2019 WEF President-Elect Jackie Jarrell. Photo courtesy of Oscar and Associates.

From 4-H to WEFTEC

Jade is now a senior at Utah State University (Logan), where she is studying civil engineering and is active in the student chapter of the Water Environment Association of Utah. She joined the university's 'Aggie Blue' student design team. During the WEF Student Design competition at WEFTEC 2018, the team presented their project proposal to maximize the anaerobic digestion process. Her team earned second place in the engineering category at the competition.

Jade explained how her knowledge of sheep came in handy as she studied cogeneration technologies. "The cogeneration process uses food waste to produce methane gas," she said. "Using this method to run a treatment facility saves both money and energy."

Jade attributes her interest in a water career to a variety of influences.

"My dad definitely guided me to wastewater when he took me on tours as a kid. I also met with an engineer at Carollo Engineers [Walnut Creek, CA] who educated me about the treatment plant design process. Learning about the process is so much cooler than people think," Jade said.

Jade has completed three successful internships, including one with the Central Valley Water Reclamation Facility in Salt Lake City. Next year, she plans to pursue a master's degree in environmental engineering with a wastewater emphasis.

The joy of learning and an appreciation for how WEF supports it, appears to run in the family.

"WEF has been valuable to me because I get to network through training and education opportunities," Cody said. "My favorite part is learning more about the equipment we use, which allows me to make more educated choices." DN

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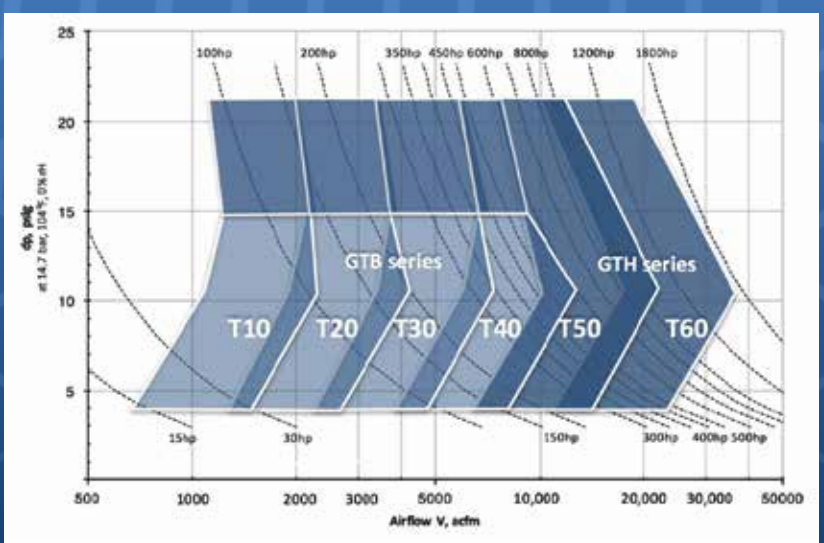

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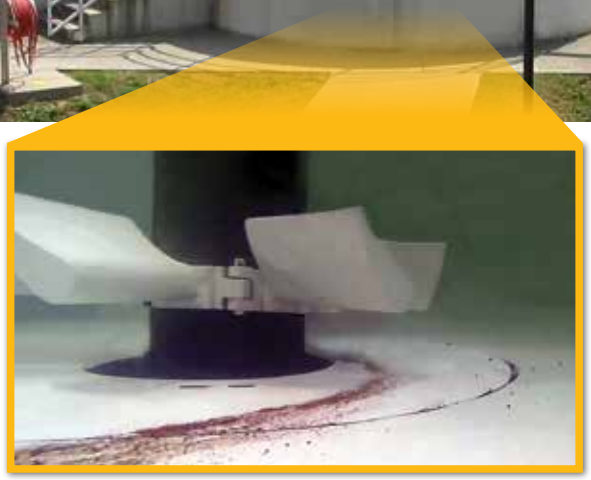

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Patrick Dube

US EPA Office of Inspector General Releases Biosolids Report

A routine investigation by the US Environmental Protection Agency (EPA) Office of Inspector General (OIG) has concluded that EPA's controls over the land application of biosolids were incomplete or had weaknesses and may not fully protect human health and the environment. However, the EPA Office of Water, which operates the biosolids program, disagrees with the findings and states that presence of pollutants does not automatically pose a risk to public health and the environment.

Throughout 2017 and 2018, OIG investigated whether EPA 'has and implements controls over the land application of sewage sludge that are protective of human health and the environment'. On November 15, OIG released a report based on its investigation titled, *EPA Unable to Assess the Impact of Hundreds of Unregulated Pollutants in Land-Applied Biosolids on Human Health and the Environment.*

OIG process and findings

OIG is an independent office that helps the agency protect the environment more efficiently and cost-effectively. OIG performs audits and investigations of EPA to prevent and detect fraud, waste, and abuse. Following an audit or investigation, OIG releases a report of findings.

In the report on the biosolids investigation, OIG found 352 unregulated pollutants in biosolids and stated that EPA lacked the data or risk assessment tools to decide safety. These pollutants are in addition to the nine regulated pollutants that EPA consistently monitors.

The report pointed to the steady reduction in staff and resources in the EPA biosolids program as a cause of many of these weaknesses. The OIG recommended that the EPA Office of Water 'address control weaknesses in biosolids research, information sharing with the public, pathogen control and training and implement corrective actions with milestones to fix these issues. The report and related materials can be viewed on OIG's website.

Office of Water response

OIG provided the Office of Water the chance to comment on the report and included their response. The Office of Water took issue with how the science was presented in the report and stated that 'there is no attempt to make it clear to the reader that the occurrence of pollutants in biosolids does not necessarily mean that those pollutants pose a risk to public health and the environment'.

The response also states that a top priority for the biosolids program will be to address the uncertainty of potential risk posed by pollutants found in biosolids but uncertainties in science does not mean that they are threats to human health and the environment.

The OIG report resulted in 13 recommendations for the Office of Water to consider. Their response provides corrective actions and milestone dates for eight of them with resolution efforts underway for the remaining five.

The Office of Water conducts biennial reviews of biosolids that include a full literature review of potential toxic pollutants and determines if the pollutants detected pose 'potential risk to human health or the environment'. The 2015 report analyzed peer-reviewed journal articles from January 2013 through December 2014 to determine their relevance to biosolids and potential pollutants. Overall, 46 articles met the eligibility criteria. Once analyzed, the biosolids program identified 29 new chemical pollutants. Following a risk assessment of these new chemicals, the Office of Water determined that no additional pollutants needed to be regulated. A 2017 report following the same intensive analysis is expected to be released in the coming months.

WEF actions

During the OIG investigation, WEF staff members were interviewed and have since been tracking the report and working with other biosolids partners to coordinate responses after the release. It is WEF's position that decades of science have shown that biosolids are a safe, renewable resource that improves our environment, lowers costs to consumers, and strengthens our farming communities.

Biosolids undergo a rigorous set of treatment processes that include physical, chemical, and biological processes to aid pathogen reduction. Utilities across the country have been safely recycling biosolids for decades while delivering innovative solutions that lead to stronger, more sustainable, and resilient communities.

WEF supports continued research on biosolids to ensure regulatory requirements continue to be based on the latest science. The WEF Residuals and Biosolids Committee (RBC) is committed to developing and promoting cost-effective practices and policies in biosolids and energy technologies associated with municipal, agricultural, and industrial wastewater residuals for the protection of the environment. Through education of WEF members, the public, and policymakers, RBC aims to serve the public interest regarding scientifically sound residuals and biosolids environmental practices and regulation.

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

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Morgan Brown and Bri Nakamura

The WEF InFLOW Program

New initiative introduces underrepresented minority students to working in water

As the 'silver tsunami' of retirements that will result in a mass exodus of US workers approaches, the water sector is taking steps to prepare as well as encourage greater diversity in its workforce. At WEFTEC 2018, the Water Environment Federation (WEF) piloted a new program to help address this need for a younger and more diverse workforce. WEF InFLOW, which stands for Introducing Future Leaders to Opportunities in Water, brought underrepresented minority students to WEFTEC and introduced them to working in the water sector. The program also sought to help these students foster a network within WEF's membership to increase opportunities for mentorship and employment.

The Exodus

New research this summer helped prompt action on the coming wave of retirements. In June 2018 the Brookings Institution (Washington, DC published the report, *Renewing the Water Workforce: Improving Water Infrastructure and Creating a Pipeline to Opportunity.* The report found that the silver tsunami will cut drastically into the pool of skilled, qualified water sector workers. For some utilities this could result in staffing vacancies of up to 50%.

The report also points out a lack of diversity in the water workforce. The percentage of black and Asian water workers lags behind the national average for all occupations combined. Additionally, for higher paying water occupations, such as engineering and management, black and Hispanic workers are particularly underrepresented.

WEF InFLOW

This pilot year of the WEF InFLOW primarily focused on African American students. African Americans are one of the most underrepresented groups with respect to the percentage of the population versus percentage engaged in STEM.

InFLOW brought a total of 16 undergraduate and graduate students to WEFTEC from Howard University (Washington, DC), Tuskegee University (Tuskegee, AL), and the University of South Florida (Tampa, FL). The group of eight men and eight women had a range of technical backgrounds and awareness of water sector opportunities. One student is pursuing a doctorate in the water sector. The students from Tuskegee University had summer internships related to water. Many other students, however, had no background knowledge of water sector possibilities.

The 2018 InFLOW program relied on generous support from program sponsors: Arcadis, GlobalWET, Centrysis/CNP, Environmental Technical Sales Inc. (ETEC), and the Milwaukee Water Council. Because of these sponsors, the students received travel assistance, hotel accommodations, registration, and special networking opportunities at WEFTEC.

Water Sector Introductions

The students' schedules included both technical and networking events. They participated in many events coordinated by the WEF Students and Young Professionals Committee. These included Water Palooza – where the USF students are now famous for introducing us to the 'Water Cycle Dance' – the Community Service Project, committee meetings, the WEF Career Fair, and Student Design Competition. The students attended the Opening General Session and were encouraged to explore the exhibition and attend technical sessions.

Aside from these traditional WEFTEC activities, the students attended two special events. The first was a networking panel that introduced the students to some African American water sector leaders who represented utilities, academia, consulting, and

WEF InFLOW participants with WEF President Tom Kunetz and panelists from a networking event scheduled just for them. (Credit: Oscar & Associates)

Students from University of South Florida teach the next generation of water students the 'Water Cycle Dance' during Water Palooza at St. Mary's Academy in New Orleans. (Credit: Rahkia Nance/Water Environment Federation)

The WEFTEC Opening General Session was among the activities slated for student participating in the WEF InFLOW program. The students received front row seats. (Credit: Oscar & Associates)

manufacturing. Panelist such as David Gadis, CEO and president of DC Water (Washington, DC), and Kishia Powell, Commissioner of the Department of Watershed Management for the City of Atlanta, talked about their journeys and career paths as well as answered the students' questions. Gadis and Powell shared their insights about how to use diversity not as a barrier, but as a quality to be remembered by. A networking lunch wrapped up the InFLOW students' WEFTEC experience.

The program already has yielded one result: Howard University is working to start a WEF student chapter. This chapter which will help to expand the program's reach to more students at the university. The chapter is hoping to participate in future Student Design Competitions.

The InFLOW program will continue to grow in the coming years. WEF intends to expand the number of participating schools and students, as well as include a second track with activities focused on operations and maintenance.

Morgan Brown is a technical programs manager in the Water Science & Engineering Center at the Water Environment Federation (Alexandria, Va.). She can be reached at *mbrown@wef.org*. **Brianne Nakamura**, PE, ENVSP, is a senior manager in the Water Science & Engineering Center at WEF. She can be contacted at *bnakamura@wef.org*. DN

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Jazzing It Up

WEAU members got together Friday, January 18 for the annual Jazz game. Tickets for the game sold out in less than two days, but we were able to get two suites with seating, complete with dinner and half-time snacks. The Jazz were able to bring home the win for a final score of 115-99 against the Cleveland Cavaliers.

We hope to see everyone out next year and at future events! Sign up for the WEAU mailing list by sending an email to *membership@weau.org* and stay in the loop. WEAU Young Professionals and Students Group (YPs) also have an email newsletter, sign up by emailing *ypweau@gmail.com*.

A big thank you goes out to the WEAU Board for sponsoring and the Young Professionals Committee for organizing! DN

is more than just talk

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

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So enjoy this magazine...and KEEP THINKING GREEN.

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Central Valley WRF GM Calls It a Career

The General Manager of the Central Valley Water Reclamation Facility, Tom Holstrom, is bidding farewell to a 41-year career in water resources engineering and facility management. A 1978 MS Engineering graduate from Utah State University, Tom entered the consulting engineering arena with Kaiserman Association, Inc in SLC. There he completed utility planning studies and designed the first plastic-packed super rate trickling filter in Utah for South Davis County SID. In 1981 he transferred to Coon, King and Knowlton, Inc. (CKK) in Murray, Utah and began work on design of the Central Valley Water Reclamation Facility (CVWRF). He acquired his Professional Engineer's (PE) license in 1982. Under the guidance of Reed Fisher, Tom served as Project Engineer for multiple Central Valley construction contracts and as Resident Engineer during construction from 1984-87. CKK was acquired by Daniel, Mann, Johnson and Mendenhall (DMJM) and the DMJM/Brown and Caldwell joint venture completed all initial phases of the Central Valley Plant in 1989. In 1987, Tom was awarded the *Contributor to the State of Excellence* award from the Governor of Oklahoma for his contribution to that state's proposal to secure the federal Superconducting Super Collider project.

Tom married his lovely wife and adventurous partner, Vicki, in 1989 and they joined two sets of boys together. Brandon, Brett, Brian and David, and their families, continue to be a blessing in Tom and Vicki's lives – and eight grandchildren provide the impetus for this latest life change.

In 1992 Tom assumed the management duties for the SLC office of the Horrocks/Carollo joint venture – directing water resources projects there until 1994. Stan Thompson and Bill Hysell offered Tom an ownership position to open a SLC office for Thompson-Hysell Engineers, Inc. (THE) from Modesto, California. Tom directed THE projects in California and Utah and built the THE/SLC office to 35 people completing land development, surveying and water resources projects. He continued on that track after THE was acquired by The Keith Companies, Inc. of southern California in 1999.

Tom was a member of the Water Pollution Control Federation (WPCF) since 1978, witnessed its name change to the Water Environment Federation (WEF), and was inducted into the SSSSS in 1994. He served as the 1997-98 WEAU President and received the Arthur Sidney Bedell Award from WEF.

In 2005 Tom returned to CVWRF to serve again under General Manager Reed Fisher as the Asst. General Manager/Process Engineer. He authored the WEAU 50th Anniversary publication *Vital Roles* in 2007. In 2012, upon Reed's retirement, Tom was appointed CVWRF's fourth General Manager. As CVWRF GM Tom implemented the 'Arbinger' mindset for employees, modified the CVWRF Interlocal Agreement to embrace a more streamlined entity ownership formula, had CVWRF join the Wasatch Front Water Quality Council (WFWQC) and began the capital program formulation and financing strategy for plant refurbishment and modernization to meet more stringent effluent limits. He will be most ably succeeded as GM by Dr. Phil Heck, PE, who has been instrumental in directing technical improvements at CVWRF.

Tom wishes to acknowledge the many people that have guided and assisted him on this unique and rewarding journey. Accordingly, an open house is scheduled for Thursday, March 21 from 2:00-4:00 pm at the CVWRF Administration Building. Please RSVP to Employee Services Manager/Board Secretary Cindie Foote *at footec@cvwrf.org.* DN

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