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DIGESTED news

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2013 Mid-year Conference ■ Deammonification ■ Identifying Corrosion

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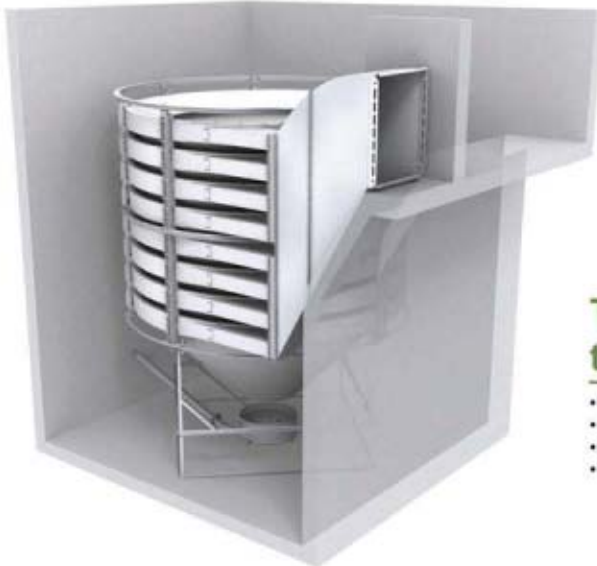


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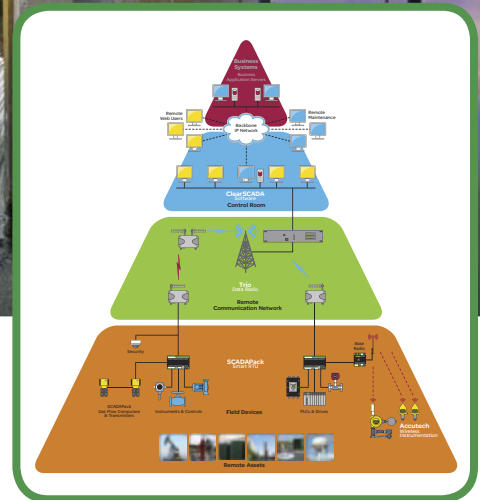
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The value of our profession to society, the environment, and the economy



Dru Whitlock

Alan Matheson, the State Planning Coordinator and Senior Environmental Advisor to Governor Herbert, will be giving the keynote address at the Mid-Year Conference on November 12, 2013 at the Utah Cultural Celebration Center. I plan on giving a short speech, taking excerpts from my address to WEAU at the 2013 Annual Conference, with the aim to emphasize the importance and criticality of our profession to the Executive Branch of the Utah Government. Please review and let me know if you have any suggestions or comments.

We know to sustain our quality of life, we need healthy ecosystems. We need clean air, reliable sustainable energy systems, a sustainable food supply, and clean water to sustain ourselves.

There is a book written by Jared Diamond called Collapse, which documents the circumstances of several isolated near human extinctions through history. Several of these near extinctions are directly related to natural resource depletion and severe environmental

“Economies cannot survive without healthy ecosystems and sustainable natural resources.”


degradation. Fundamentally, if our environment is severely diminished, we cannot sustain ourselves without suffering, and we certainly cannot sustain our current standard of living.

WEAU's mission statement is in concert with environmental preservation. In sum it states: "... we are dedicated to the preservation and enhancement of the water environment." Protecting the water environment, that is, returning the water safely to natural systems or safely reusing it, is job one. But we can do more: hydrocarbons and nutrients can be derived from wastewater residuals, which can be used for energy and fertilizer. Our facilities can produce nutrients, energy, and water and many facilities are adopting that philosophy, that is,

enhancing or implementing resource recovery systems. We're going beyond compliance-driven systems to resource-recovery systems.

In addition to societal and environmental benefits, our work is essential to a sustainable economy. Simply stated, economies cannot survive without healthy ecosystems and sustainable natural resources; economies also cannot survive without a robust population of scientists, engineers, and skilled laborers. Indeed, our clean water and resource recovery industry also contributes to the economy directly with infrastructure expansion and repair and replacement as well as the operation of our Publicly Owned Treatment Works. The services our professionals provide cover the triple bottom line: societal, environmental, and economic sustainability.

The societal/environmental/economic benefits we provide are what I am proud of in addition to the diversity and competency of the various members of our profession. We are the individuals who educate, administrate, engineer, construct, operate, and maintain our clean water and resource recovery systems. We are the individuals who provide regulatory oversight to ensure compliance.

As the president of the Water Environment Association of Utah, I am proud to introduce to you today the professionals who serve this great state in a fundamental and an essential way. I, also, welcome the Executive Branch's perspective of Utah's clean water and resource recovery professionals and the value they bring to the state of Utah. 

Dru Whitlock
President



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Time flies

Chad Burrell

I hope you enjoy this issue of the *Digested News*. Time has gone by so quickly and it is already time for the Midyear Conference. With that in mind I wanted to publicly thank Jim Schwing for all the efforts he has put into Midyear Conferences over the years. He may not want me to say this, but when I send him an email requesting things, I love the automatic response that I get from him stating "I'm pretty much retired and don't get in the office very much....." then he always gets back to me later with help in one way or another. Well, as far down the road as it may seem for me I hope the day comes when I can "pretty much retire", and I hope that does not mean I become inactive, but rather continue in those things I really enjoy. I wish that for all of us. **DN**



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SCREENINGS & HEADWORKS

M2 RENEWABLES

Pretreatment, Primary Clarification

DUMPSTERVEYOR

Solids Container Handling Systems

HUBER TECHNOLOGY

Screens (Step, Perforated, Wedge Wire, Bar Rake, Septage, and for MBRs), Wash Press and Grit Washer

JDV

Shaftless Screw Conveyors

LAKE SIDE

Screens (Perforated Plate, Bar, Septage, and for MBRs), Wash Press, Grit Removal and Grit Washers

PLASTI-FAB

FRP Parshall Flumes, Weirs, Buildings, Slide Gates, Stop Logs

POLYCHEM

Grit Removal System (Chain & Flight)

WESTECH

Screens (Perforated Plate, Bar, Step, Sludge), Grit Removal, Grit Classifier

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Hydraulic Trickling Filter Rotary Distributor,
Rotating Drum Aeration Process,
Slow Speed Mixing with Fine Bubble Aeration

CLARIFICATION

M2 RENEWABLES

Alternative Primary Clarification

LAKE SIDE

Secondary Clarifiers

NEFCO

FRP Stamford Density Current Baffles and Launder Covers

POLYCHEM

Rectangular Non-Metallic Chain & Flight Clarifiers

POLYTECH

Rotary Pipe & Helical Scum Skimmers

WESTECH

Primary and Secondary Circular Clarifiers

FILTRATION

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M2 RENEWABLES

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DISINFECTION

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DIGESTION

AEROMIX

Coarse Bubble Diffusers

MTS

Aqua Turbo

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Mechanical Mixing, Digester Covers & Digester Heating Systems

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Class A Biosolids Treatment

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ENPRO

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FENTON

Class "A" Sludge Drying Process

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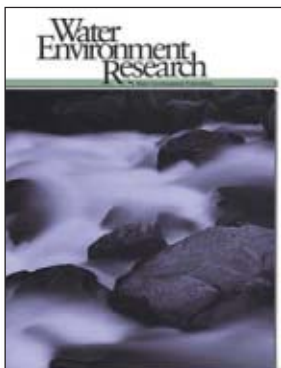
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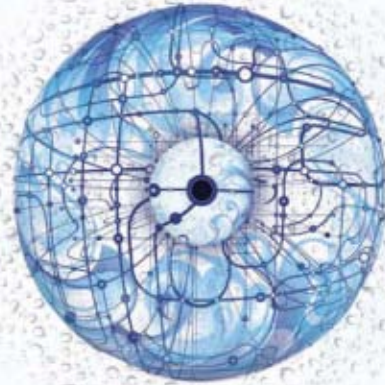
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WEAU

The **Water Environment Association of Utah** is dedicated to the professional growth of its members and the preservation and enhancement of the water environment.



2013 MID-YEAR CONFERENCE

Continuing Education

Are you a certified operator in need of continuing education units? You can earn 0.6 Conference CEU by attending the WEAU Mid-Year Conference.

Are you a professional engineer? It is required that you complete a minimum of 24 hours of professional continuing education within a two-year renewal cycle. The WEAU Mid-Year conference has been registered with the Division of Occupational and Professional Licensing (DOPL). The time you spend at the conference counts toward your continuing education requirement.

Registration

Please complete and return the registration form before November 7, 2013 for the best rates. Forms and information are available at www.weau.org. A continental breakfast and lunch are provided as part of the registration.

Pretreatment Trainings

December 12, 2013 at Timpanogos and March 27, 2014 at Jordan Basin WRF.

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2013 WEAU Mid-Year Conference Technical Session Schedule

TIME	SESSION A1	SESSION B1	SESSION C1
8:00 - 8:30	REGISTRATION AND CONTINENTAL BREAKFAST		
Topic	<i>Storm Water Quality</i>	<i>Emerging Technologies</i>	<i>Operations Training I</i>
8:30 - 9:10	Tracer study of an urban storm water exfiltration collection system at Green Meadows, Logan, Utah <i>Thomas Reuben (Utah State U.)</i>	Anaerobic digestion of duckweed and the potential use of digester effluent as a feed source for heterotrophic micro-algae growth <i>Leila Ahmadi (Utah State U.)</i>	Wastewater Math – The Essentials; Review of Math Rules and Dimensional (Units) Analysis <i>Sharon Burton (CVWRF)</i>
9:20 - 10:00	The impact of coarse particulate organic matter in storm drains on oxygen consumption in the Jordan River <i>Jacob Richardson (Utah State U.)</i>	Harvesting Effects on Pollutant Removal by Various Plant Species at a Stormwater Treatment Field Demonstration Site <i>Malgorzata Borecki (Utah State U.)</i>	Wastewater Math – The Fundamentals; Volumes and Detention Time, Removal Efficiency, Pounds Formula <i>Sharon Burton (CVWRF)</i>
10:00 - 10:20	BREAK		
Topic	<i>Biosolids</i>	<i>Sustainability</i>	<i>Operations Training II</i>
10:20 - 11:00	Something Smells Fishy: Dewatering Without Polymer <i>Nathan Zaugg (MWH)</i>	Resource Recovery During Wastewater Treatment – A Paradigm Shift in Activated Sludge Operation <i>Amir Motlagh (Univ. of Utah)</i>	Wastewater Math-Intermediate Level; Trickling Filter Loading, Chemical Dosing, Strength of Solution <i>Sharon Burton (CVWRF)</i>
11:10 - 11:50	Sustainability in Solids Reduction and Nutrients Removal in Activated Sludge Operation <i>Pei Huang (Univ. of Utah)</i>	AquaPonics: Is This the Sustainable Solution for Nutrient Removal? <i>Ken Burgener (North Davis Sewer District)</i>	Wastewater Math-Advanced; MCRT Calculations, Air Requirements/Oxygen Uptake, TSS/VSS, Digestion <i>Sharon Burton (CVWRF)</i>
12:00 - 1:20	Lunch and Keynote Speaker – Alan Matheson; Governor Herbert's Env. Policy Advisor		
TIME	SESSION A2	SESSION B2	SESSION C2
Topic	<i>Nutrient Removal I</i>	<i>Treatment Plants</i>	<i>Collection Operations I</i>
1:30 - 2:10	Total Phosphorous, Nitrogen and Metal Reduction by Six Plant Species in a Controlled Greenhouse Experiment <i>Malgorzata Borecki (Utah State U.)</i>	Jordan Basin, an Overview of the Facility and It's Nutrient Removal Requirements <i>Weston Youd (South Valley Sewer District)</i>	Public Utility Easements as They Relate to Sewer Lines <i>Jeremy Cook (Legal Counsel Cottonwood ID)</i>
2:20 - 3:00	Variances to Water Quality Standards 101 <i>Chris Bittner (Utah DWQ)</i>	Central Weber's New Expansion <i>Jeff Kirkman (Central Weber)</i>	Hazard Communication Standard (HCS) update to the new Globally Harmonized System (GHS) <i>Utah Local Governments Trust</i>
3:00 - 3:20	BREAK		
Topic	<i>Nutrient Removal II</i>	<i>Contaminants of Concern</i>	<i>Collection Operations II</i>
3:20 - 4:00	What water quality standards are appropriate? Development of water quality standards for Willard Spur, Great Salt Lake, Utah <i>Jeff DenBleyker (CH2M Hill)</i>	Brine Fly and Brine Shrimp Toxicity Testing for Great Salt Lake <i>Chris Bittner (Utah DWQ)</i>	Job Safety Analysis – Workplace Hazard Assessment <i>Utah Local Governments Trust</i>
4:10 - 4:50	Biological Phosphorus Removal 101 <i>Clint Rogers (Carollo)</i>	Recent Changes to Utah Pollution Discharge Elimination System (UPDES) Permitting for Great Salt Lake <i>Chris Bittner (Utah DWQ)</i>	Overview of Blue Stakes Program Including Responsibilities of Utility Owner/Operators <i>Gary Hansen (Blue Stakes of Utah)</i>

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Weftec Operator Challenge 2013

I cannot believe how fast this year has flown by already. It seems like just the other day we were all in St. George competing against each other and having a great time at Fiesta Fun. In a couple of weeks, the Wasatch All-Stars and the North Davis Royal Blue teams will be competing on a national platform against the best teams in the industry. As I have had the pleasure to get to know these guys and to watch them practice, I am very confident that they will knock it out of the park in Chicago. It is amazing to see the camaraderie that the teams have developed. They really push each other to be the best they can be at practice.

I personally feel like this could be the year that one of these teams takes first place overall in Nationals. Utah seems to always be in the top ten every year that we have competed. In 2008, Utah placed second overall but we haven't reached our goal of first place yet. The North Davis Royal Blue team members are Captain Gordon "Gordo" Call, Tyler "Stretch" Barfuss, Tom "Larry" Anderson, and Jason "Wifi" Stansfield. They are coached by Bryce

“I personally feel like this could be the year that one of these teams takes first place overall in Nationals.”

“Uncle B” Southworth. The Wasatch All-Stars team members are Captain Dustin “Lew” Lewis, Hadley “Giggles” Gunn, Jonathan “The Gubenhater” Gubler, and Clay “Manchild” Marriott. They are coached by Dave “Smiley” Smilanich. Dave could move from coach to participant any day now considering Hadley’s past record. Heck, I am surprised he has not hurt himself yet. I did hear that he tried real hard a couple of times by riding his horse into a fence. After watching the Wasatch All-Star team practice, I think they should change their name to the Vertically Challenged All-Stars. I swear Clay is the only member on the team over 5’5”. He looks like a “Manchild” compared to his teammates. I know a couple of the guys still have to ride the kiddie rides at Lagoon because they are

not tall enough to ride any other rides there. You could stack Lew, Giggles, and The Gubenhater on each other’s shoulders and they still wouldn’t be taller than Stretch from the Royal Blue team. Speaking of Stretch, I think they should change his nickname to “Shaggy” from Scoobydoo. You’re so young; you probably have no idea who that even is. Just ask Gordo he will tell you.

All kidding aside, I know both teams are going to do great at Weftec. I would like to say thanks to the WEAU Board and all the entities for your continued support of our OPS Challenge teams. That is without a doubt why Utah does so well year after year at Nationals. Thank you for providing us with the equipment and tools we need to compete at a high level every year. Best of luck to both teams and we will see you in Chicago. **DM**



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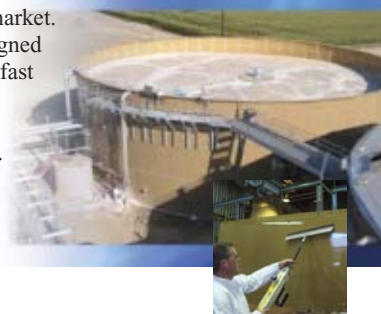
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CORROSION

PROBLEMS AND MITIGATION STRATEGIES IN THE WASTEWATER SYSTEMS

By Eric Dupre', NACE Member & Committee Chair
Reprinted from *SC Journal*, Fall 2012

The words 'out of sight and out of mind' are the best synopsis to describe the current status of US wastewater collection systems in 2012. When the American Society of Civil Engineers has rated our wastewater infrastructure with a D-, and the estimated annual expenditures range in the billions, we know we have a serious pandemic on our hands. If that is not enough to catch your attention on the magnitude of this issue, please note that the US Department of Defense has been tasked with analyzing the negative impact of this situation on the US economy. As budgets become more stringent to maintain and sustain these growing and aging systems, the problems will only manifest themselves exponentially if not properly addressed. According to the US EPA's *2009 Rehabilitation of Wastewater Collection and Water Distribution Systems*, "we are at the dawn of the replacement era" and timing is paramount to addressing current and future challenges. This report will identify key corrosion issues found in wastewater collection systems and how to mitigate these effects through proven strategies.

In order to analyze any problem, you must first be able to identify the root cause and understand the dynamics involved in the process. Wastewater Collection Systems are designed to be closed carrier systems that safely transfer sewage materials away from homes and facilities to a treatment plant, without or with very little environmental impact. The various sewage materials, gases, temperatures, volumes, and movements all contribute to the type and amount of corrosion found

in each wastewater collection system. That said, the most important thing to consider is the reaction between this toxic corrosive cocktail and the materials used to construct the transport structures that move the sewage from point A to point B inside the collection system.

Of all the forms of corrosion found in the wastewater collection system – such as hydraulic abrasion, stress, and natural age deterioration – the most damaging corrosion, and one that results in premature catastrophic failure, is caused by hydrogen sulfide gas (H_2S). Under anaerobic (septic) wastewater conditions, sulfides cannot be oxidized. Therefore, they combine with hydrogen to produce hydrogen sulfide gas, creating the 'rotten egg' odor associated with septic wastewater. If the concrete sewer is normally only partly full, the damp surface above the water line is home to aerobic bacteria that oxidize the H_2S and produce sulfuric acid (H_2SO_4), which attacks the calcium carbonate constituents of concrete. The process results in the corrosion of collection system pipes, manholes, lift station wells, and other concrete structures. Also known as microbial-induced corrosion (MIC), this problem is a result of bacteria that creates biogenic sulfide corrosion.

Since the majority of US wastewater collection systems are made of concrete structures, this is very problematic. Basically, once the sulfuric acid comes into contact with the cement glue binder that holds the concrete together, it dissolves the cement, turning it into a deteriorated white powder. The cement glue loses its binding properties and



The effects of concrete exposed to high levels of H_2S can be seen in these photos.



This sewer manhole was ravaged by H₂S then structurally restored with Manhole Mortar™ and coated with 100% solids epoxy to prevent future corrosion and protect exposed concrete surfaces.

relatively recent. Since its inception, precast concrete was and is the strongest and most affordable infrastructure building material, but it has its limitations when it comes to long-term wastewater corrosion exposure.

At the same time, metal – the second most abundant construction material used in the construction matrix of the wastewater collection system – is not immune to the effects of hydrogen sulfide gas (H₂S) attacks and toxicity. When exposed to low pH levels over time, ductile iron, cast iron, galvanized, and even stainless steel will eventually corrode if not properly coated or lined. Discharge pipes, access covers, vent pipes, and tanks need corrosion protection consideration as well.

Now that we have identified and understood the root cause of the corrosion problem, we can move forward to prescribing proper procurement. A protective surface coating or liner can be installed to protect the exposed concrete surface from contact with hydrogen sulfide/sulfuric acid. This will exponentially increase the service life and offer the highest return on investment (ROI) possible. Existing in-ground metal, concrete and masonry structures can also be restored and rehabilitated utilizing low impact trenchless technology methods. If these existing structures have not yet failed or lost their minimal

structural integrity, they are perfect candidates for restoration that will enable them to meet or exceed their original design. A protective coating or liner can be installed to prevent future deterioration damage. With today's technological advancements, materials, and accessibility to information, there is no reason that this nation cannot reverse these effects and control its current path.

To ensure successful application of these mitigation strategies we must focus on three simple items:

1. proper evaluation and assessment;
 2. industry standards, guidelines and protocols; and
 3. proven techniques and materials.
- Centralizing and standardizing industry protocols for all levels of federal, state, and local entities will curb costs and provide greater consistency throughout. Identifying that this is a special and critical scope of work, that requires industry certification for designers, system operators, inspectors, and installers, will ensure better overall continuity of quality assurance and quality control over the end result and final product. Choosing the proper building materials on newly constructed systems and structures is also critical to avoiding the majority of these corrosion issues on the front end rather than dealing with corrosion after the fact.

Understanding material selection for new or existing structures can be complex, due to the extreme nature of the environments in which they exist as well as the structural requirements to support required loads. Over the last 200 years or more, the sourcing of affordable and local materials has evolved from wood, masonry, metals, and concrete to thermal plastics, PVC, epoxy resins, fiberglass, high density polyethylene, polymers, carbon fiber and composites. These revolutionary materials exhibit high strength, lightweight construction, and corrosion resistance far beyond traditional construction materials. These materials can be used independently or in conjunction with one another. They can be combined to meet or exceed desired design criteria. Cost, time, and sustainability are also factors that have to be part of the selection process in order to determine practicality and feasibility. Fully understanding the limitations and expectation of these materials and how to apply them successfully needs to be considered as well. The majority of the materials mentioned above are completely inert and exhibit resistance to corrosion far beyond what standard concrete, mortar, brick, masonry, or metal materials can tolerate.

Many factors influence overall design and procurement needs in each system – as they are all unique; therefore wisdom and experience shared between industry professionals, owners, and organizations will empower decision-makers to make better-informed decisions. Proper planning and execution of these practices will ensure that maximum service life potential is reached and the best possible return on investment is obtained. [DVI](#)

For more information about this article please contact Eric Dupre' at 956-763-7898.

“Choosing the proper building materials on newly constructed systems and structures is also critical to avoiding the majority of these corrosion issues on the front end rather than dealing with corrosion after the fact.”



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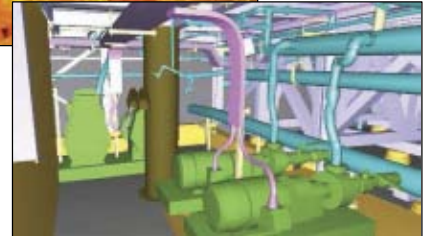
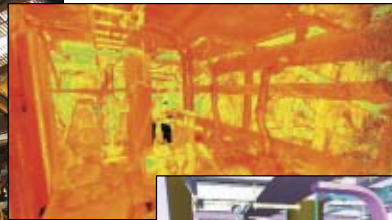


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DEAMMONIFICATION

as a sidestream option to manage total nitrogen in full scale wastewater treatment plants

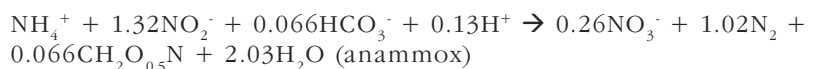
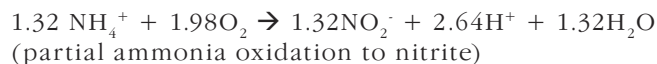
By **Ramesh Goel, Associate Professor**

Civil & Environmental Engineering, University of Utah, Salt Lake City, Utah 84112

Nitrogen is an important nutrient for the growth of all living organisms and plants. However, its presence in the environment in excess quantities, especially in surface waters can cause adverse environmental problems such as eutrophication of surface waters. Among several inorganic nitrogen species, ammonia nitrogen is the preferred form of nitrogen for the growth of algae and bacteria. As a result, depending upon the regulatory requirements imposed by local and federal agencies, municipal wastewater treatment plants are generally required to remove ammonia nitrogen before the treated wastewater is discharged into receiving waters. Biological process, commonly known as nitrification, is used to remove nitrogen from wastewater and hence, nitrification exists in most aerobic biological treatment plants. Nitrification is a two-step process. In the first step, ammonia nitrogen is oxidized to nitrite nitrogen. In the second step, nitrite nitrogen is further oxidized to nitrate nitrogen. These two steps are carried out by two different groups of bacteria collectively known as nitrifying bacteria. If treatment plants are required to achieve complete nitrogen removal, nitrate reduction (i.e denitrification) to nitrogen gas in the absence of oxygen is employed.

Anaerobic ammonia oxidation (anammox) has evolved as a promising nitrogen transformation pathway that is being considered by wastewater community around the globe as a viable option for nitrogen management, especially for the sidestream treatment of anaerobic digester supernatant and belt press filtrate. For nitrogen removal of high strength wastewater such as the filtrate

or anaerobic digester supernatant, ammonia nitrogen is partially oxidized to nitrite first and then anammox bacteria use the remaining ammonia and freshly generated nitrite nitrogen to denitrify. The process of aerobic ammonia oxidation to nitrite (known as nitritation) followed by anaerobic ammonia oxidation is collectively known as “deammonification”. These two steps are shown below.



“Anaerobic ammonia oxidation has evolved as a promising nitrogen transformation pathway.”



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Deammonification has several advantages over conventional nitrification followed by denitrification for the complete nitrogen removal. First of all, since both processes (i.e. nitrification and anammox) are carried out by autotrophic organisms, the process does not require organic carbon. The net biomass yield in deammonification is much lower. Furthermore, the process consumes significantly less alkalinity and oxygen than those needed in conventional nitrification and denitrification.

Consistent ammonia reduction of 90-95% and total nitrogen reduction of 80-85% has been demonstrated through the use of deammonification. The process can include both a two reactor or two stage arrangement, also known as SHARON-Anammox (Nitrification-Anammox) process, or in one reactor or single stage arrangement, also known as the CANON (Completely Autotrophic Nitrogen removal Over Nitrite) process.

Despite significant research progress related to deammonification around the world, the full scale implementation



Figure 1: Shows anammox flocs in an ongoing reactor fed with real filtrate.

of deammonification has been limited to Europe (mostly in Netherlands) and now in China. Several full scale deammonification plants are in operation in Europe and China and several more are planned in the near future. However, the application and implementation of deammonification in the United States has been slower than expected although few pilot and full scale projects are in the pipeline. This is possibly due to the common notion among the wastewater practitioners that anammox bacteria

are very slow grower and difficult to manage. This belief is however proven to be somewhat wrong in the light of latest research. Anammox bacteria, although slow grower, are very robust. The anammox bacteria tend to form bigger flocs and provide excellent operational stability. Figure 1 provides a picture of actual settled anammox biomass from an ongoing laboratory scale anammox reactor fed with real filtrate from a local wastewater treatment plant.

From operational point of view, the critical step in deammonification is nitrification (partial ammonia oxidation). The challenge generally is to control the oxidation of ammonia to nitrite without letting the nitrite further oxidized to nitrate. High temperature has been demonstrated to outcompete the nitrite oxidizers. Furthermore, high temperature boost the growth of anammox bacteria. Hence, running deammonification process at high temperatures (30~35°C) offers dual advantages.

Dr. Ramesh Goel's research group has been researching anammox bacteria for the treatment of real filtrate. Currently, with his graduate student Sha Hu, he is developing start up strategies for attached growth deammonification process and comparing the attached growth deammonification with the suspended growth for their ability to handle sock loads, toxicity and heavy metals.

In summary, deammonification has the potential to revolutionize nitrogen removal needs in wastewater treatment. The applicability of deammonification for the sidestream treatment of filtrate is well proven and its application at full scale in the United States will soon be very common in near future. The current research efforts are evaluating the efficacy of anammox to remove nitrogen in the main stream treatment train. [DOI](#)

“The application and implementation of deammonification in the United States has been slower than expected although few pilot and full scale projects are in the pipeline.”

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Four ways to counter the costs of disaster

By Lucien Canton

Following the Northridge Earthquake in 1994 many businesses that had survived the temblor relatively unscathed suddenly found their revenues declining. For a number of years prior, the region (30 miles northwest of Los Angeles) had been experiencing a minor population exodus as the aerospace industry declined in response to lower government spending. Many people who had lost their jobs and were close to retirement saw the earthquake as the last straw and moved away. The availability of housing attracted a new wave of immigration consisting largely of Korean and Latin American families. Companies that failed to recognize and adapt to the new demographic went out of business.

Why do so many businesses fail after disaster? The answer often lies in a failure to understand the true costs of the disaster.

Disasters are complex and there are many levels of concern that could affect a business. The most obvious is the physical damage produced by the earthquake. One would think that this is both easy to identify and quick to resolve. However, many businesses fail because they either did not carry sufficient insurance or misunderstood the coverage they did have, severely limiting their resources for reconstruction. There is also an assumption that needed resources are available to rebuild. However, damaged infrastructure that affects deliveries and an increased demand for building supplies and contractor services can create delays that prevent timely business resumption.

The physical damage caused by disaster is not the only source of loss. Businesses frequently overlook a hidden

financial side to disaster losses. Some of these are obvious, such as the need to pay overtime for additional work by employees to restore facilities or reduce work backlog. Others sources if financial loss can be far more subtle. For example, failure to pay a suppliers bill on time can result in a service charge. Failure to meet the terms of a client contract might result in penalties.

The single biggest mistake, however, is looking solely at the business and not being aware of what is happening in the larger community. There are three main areas that are frequently overlooked:

1. What's happened to community infrastructure?

How bad is the damage? Are transportation corridors closed or damaged, and if they are closed, for how long? A business may survive



“Many businesses fail because they either did not carry sufficient insurance or misunderstood the coverage they did have, severely limiting their resources for reconstruction.”

but if it depends on the delivery of goods, either from suppliers or to customers, damaged transportation infrastructure will have a direct impact on the company's recovery. Long-term utility outages will also affect business resumption, particularly if the business has not arranged for off-site backups of critical files and records or relies on Voice over Internet Protocol (VOIP) and Private Branch Exchange (PBX) systems.

2. What's the impact on your customer base?

Is the demand for services likely to increase, decrease, or stay the same? Is there potential for generating additional business? Commercial linen companies serving the hospitality industry will frequently see a drop in demand while those servicing hospitals see an increase. Failure to adapt to these changing demands might result in a competitor taking over the client and experience suggests that once lost, these customers are seldom regained.

3. What's the impact on your labor pool?

Are employees likely to remain or will they move out of the area? Will employees leave for higher wages in other communities or with competitors? Will there be large-scale evacuations as was seen in New Orleans after Hurricane Katrina? This resulted in a labor shortage that was exacerbated by extended unemployment benefits and government assistance.

While each disaster is unique, there are four common ways that one can avoid many of the pitfalls that are associated with them:

1. Plan for adequate financial reserves.

This is not always easy, particularly for small businesses, but it is critical in dealing with disaster. Review insurance coverage annually and understand what is covered and what is not. Know the process and requirements for filing a claim and get emergency contact numbers.



“The single biggest mistake is looking solely at the business and not being aware of what is happening in the larger community.”

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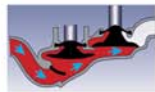
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2. Prioritize employee welfare.

Develop people-focused plans that not only center on managers and key employees, but consider families as well. Employees are more apt to remain on the job if they know their families are safe. Keep the lines of communication open with employees during the crisis. Rumors about the business closing or not being able to meet payroll can heighten anxiety and cause employees to seek other jobs.

3. Manage customer expectations.

Open lines of communications as early as possible and share your plans with them. Customers can accept delays or inconveniences if they know about them and are not taken by surprise.

4. Pay attention to what is going on in the community.

Disasters don't create social problems. They take problems that were already there and make them worse. A demographic shift had been going on in Northridge for several years before the earthquake; the disaster accelerated the process.

One of the keys to surviving a disaster is to know its true cost. This cost is not only the physical damage or temporary loss of business. It also includes intangible costs caused by the long-range impacts it has on the affected community. Recognizing these impacts and adapting to them is the only way to ensure solid business resumption. [DRI](#)

About the Author:

Lucien G. Canton, CEM is a consultant specializing in preparing managers to lead better in crisis by understanding the human factors often overlooked in crisis planning. A popular speaker and lecturer, he is the author of the best-selling Emergency Management: Concepts and Strategies for Effective Programs. For more information, visit www.lucienecanton.com, or email Info@lucienecanton.com.



WHO DISCHARGES AT YOUR FACILITY?

More importantly, should you allow this to happen?

By Rick Allen

As we see more and more of the larger communities refusing to take on Grease (FOG), Septic and Chemical Toilet materials, many hauler/pumper companies are moving to smaller communities for their discharge. And with the ever growing oil and gas exploration business in the United States, many municipal wastewater systems are agreeing to receive these materials in the wastewater streams. The reason that many of the larger wastewater systems are refusing to take hauled materials is because they have seen what it can do to their plants. They are seeing their digesters die, lagoons die and increases in solids and odor, just to name a few. We find that the smaller cities and towns are, now, contracting to take this material, because the hauling companies offer to pay them significant amounts of money for this service. We have seen charges as low as two cents per gallon and as high as 15 cents per gallon. If you agree to take on this waste, make

“The reason that many of the larger wastewater systems are refusing to take hauled materials is because they have seen what it can do to their plants.”

sure you are comparable to others in your area on cost. Also, try to set your charges to insure that you are adequately compensated for any additional costs you may experience for the maintenance and possible retrofit your system may require.

In reality, is the added income enough to offset the added cost of operations for the system? Will the added load cause the wastewater system to be out of compliance on their NPDES or DPHE permits?

Once, the dischargers quit using your system, are there any residual effects or problems that may become an ongoing or

costly fix for your system. The answer is most definitely, YES!

What are the issues you could be facing in the short and long term? One, is the added loading of these sometimes caustic materials that can completely kill all the biology in your system. We are seeing this happen in many communities across the country. Some of them are being killed off monthly with materials from septic and oil field haulers.

The addition of these types of hauled waste can significantly increase the BOD load in your system and also, the TSS load. This can cause your system to

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“I recommend that you work closely with the circuit riders from your state to make sure you are covered and that they agree with what you want to do.”

lose efficacy and eventually throw you out of compliance on your NPDES or DPHE permits. The amount of BOD load in these materials can be in excess of 2000 ppm and TSS can be even higher at 10,000 or more. Fats, Oils and Grease (FOG) can exceed 150 ppm. And that does not take into consideration the chemicals that are in the material, many of which are not friendly to your Bacteria.

And of course, grease or FOG haulers can impact your system with additional BOD, TSS and in some cases massive amounts of foaming.

Oil field waste can contain high concentrations of petroleum hydrocarbons along with chlorines and other cleaning chemicals. None of these will be beneficial to the natural occurring bacteria in your system.

These types of dischargers to your system can cause a significant increase in solids build up in your system, causing activated sludge plants to waste, handle and haul more solids. Also, due to the additional loading you may be required to run parts of your system harder, like aeration and mixing.

In a lagoon system, they can cause an increase in sludge layer, which eventually will need to be dredged. At an average cost of between \$100 and

\$300 per dry ton, this will be costly to mitigate. Wyoming Rural Water developed a sludge cost calculator that may be of interest to you. It will help you determine the cost of removing your existing sludge. And will also help you to determine some of the additional costs in the future. Please, contact Mark Court at Wyoming rural water for assistance with the calculator.

Depending on the type of materials that are being discharged to your system, you may also run into land use issues with the sludge or solids. This could cost you more due to the dewatering and handling requirements if the sludge is contaminated.


Now the question arises, how should you handle these materials if you decide to accept them at your plant? We have seen many scenarios over the years. Some include receiving the materials at the farthest point away from the plant as possible. The theory being there will be additional mixing and blending in the lines. Others have large tanks or ponds which allow them to trickle feed the septic, grease or chemicals into the plant. This way they do not have a shock to the system. And lastly, some just have it dumped in at the head works (NOT RECOMMENDED).

Another concern for communities is

the local RV park and, more importantly, do you have an RV dump? We have seen many systems killed from the materials being discharged at RV dump stations. Make sure you are monitoring your RV dumps, which may include keeping it locked unless a city employee is there to supervise. A lot of Crystal Meth chemicals are being injected (yes, an intentional play on words) into your systems through these sites.

Ultimately, the decision is yours. What are the positive aspects (usually money) versus the negative aspects (usually compliance issues and money) to determine if you really should do this? I recommend that you work closely with the circuit riders from your state to make sure you are covered and that they agree with what you want to do. Remember it takes a long time and lots of money to restart a system if dies.

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If you need more information or have any questions contact me, Rick Allen, via phone at (303) 888-2008 or via email at rick@environmentaltrainer.com 



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Since 1928, the Water Environment Federation (WEF) has guided technological development in the water community. As a leading source of water quality information, WEF works to provide its members, public officials and the general public with the necessary tools to engage in or learn ways to improve quality of life through the sustainable management of water resources, water protection, and water and wastewater treatment.

Water should be clear, but not invisible.



Indispensable to jobs, the economy, our health and our communities, water runs through our lives in many ways.

We must all work together to keep our water clean and healthy. To do that, we each need to learn to value water. We need to invest our time and energy in protecting our natural resources and infrastructure. And we need to come together to share an important message:

WATER'S WORTH IT[®]

YOUR RESPECT

Communities are Built on Water

Unlike people in many parts of the world, Americans have access to safe and clean water and sanitation services. Our water and wastewater treatment systems are world-class. Every community is literally built on top of this infrastructure and wouldn't be possible without it. You may not give it a second thought, but now's the time to stop and think about water and how essential these services are to your life.

YOUR EFFORT

Clean Water is Everyone's Responsibility

We all consume water and create waste. In fact, the average American uses 176 gallons of water a day¹. Every drop that enters your home or business is treated and discharged back into the water cycle. Water is a finite resource; it must be managed well. Everybody uses water. Everybody is responsible for it.

YOUR HEALTH

Water IS Life

Up to 60% of the human body is water, the brain is 70% water, and the lungs are nearly 90% water. We are made of water and we can't survive without it. But the water we need also must be clean. Water and wastewater treatment has changed the lives of millions of Americans—all but eliminating fatal diseases like cholera, typhoid, dysentery, and hepatitis. America has some of the cleanest, safest drinking water in the world and it must be preserved. Your life depends on it.

YOUR FUTURE

Dealing with an Aging Infrastructure

Turning on the tap or flushing the toilet is as simple as turning a knob or pushing a handle. What you don't see is the vast infrastructure — 800,000 miles of water pipe and 600,000 miles of sewer line² — that takes over from there. These systems have worked silently for years, in some cases more than a century, without major interruptions, but now they need your attention. Your investment is needed to keep infrastructure functional for current and future generations.

OUR PASSION

Finding Solutions for the 21st Century

The water sector constantly seeks innovative solutions to community and water system challenges. Undertaking efforts, such as reclaiming water for reuse and generating energy from wastewater, enable the sector to adapt to our changing environment and be good caretakers of our water resources. Water professionals have dedicated their careers to providing clean and safe water to protect everyone's health, planet, and quality of life. Water is our passion.

YOU NEED WATER. WATER NEEDS YOU.

We all have something at stake when it comes to water. Each of us also has a valuable contribution to make. But first we need to understand the issues. That's where WATER'S WORTH IT comes in.

WATER'S WORTH IT is a messaging campaign that will help answer the questions about how our actions, attitudes, and the things we most value are so closely connected with water. And it will help you to be as good to water as water's been to you. To learn more, visit www.WatersWorthIt.org.



¹ United Nations Development Programme, Human Development Report 2006 (March 2006), p. 34. <http://hdr.undp.org/en/reports/global/hdr2006/>

² General Accounting Office, Water Infrastructure: Comprehensive Asset Management Has Potential to Help Utilities Better Identify Needs and Plan Future Investments (March 2004), p. 14. <http://www.gao.gov/new.items/d04461.pdf>



USE PAPER RESPONSIBLY

Today's forest industry is working hard to become one of the greenest industries on earth.

- ♻️ What other industry plants hundreds of millions of trees every year?
- ♻️ What other industry actually grows more of its main resource than it consumes?
- ♻️ What other industry generates most of its own energy needs from renewable resources, including waste biomass, biogas, hydro and wind?
- ♻️ What other industry uses a renewable resource and recycled stock as its main ingredients?
- ♻️ What other industry has worked harder on improving its environmental performance with partners and advocates including governments, customers and environmental groups?

Paper is an essential part of human civilization. While we all use and depend upon electronic communications, it is easy to ignore that it comes at an environmental cost.

Worldwide spam email traffic creates greenhouse gases equivalent to burning two billion gallons of gasoline yearly, with numbers rising. More than 200 million items of toxic e-waste are thrown away every year in the US alone, with a recycling rate of only 18% compared to 57% for paper. Estimates are that North Americans throw out more than 500,000 toxic computers and cell phones every day.

No industry is perfect. But the paper industry has made, and continues to make, huge investments in environmental responsibility. Specifying and buying paper from certified sources ensures the continuation and growth of carbon-absorbing forests. Using paper with appropriate amounts of recycled fibre helps preserve forests, conserve energy, and maximize fibre usage through paper lifecycles.

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QUIZ

By Brett Olson

1. What is the flow if your plant uses 57 pounds of chlorine in 24 hours to achieve a dose of 2.3mg/l?
A. 4.3 mgd B. 3.3 mgd
C. 245 gpd D. 3.0 mgd
2. The chlorine demand of your raw water is 3.8 mg/L. If you treat 755,000 gallons of this water with 35 pounds of chlorine gas, what will the chlorine residual be?
A. 5.5 mg/L B. 1.75 mg/L
C. 2.5 mg/L D. 9.3 mg/L

3. With a flow rate of 2.3 mgd, what is the detention time of a circular clarifier that is 14 feet deep and has a diameter of 37 feet?
A. 1.7 hours B. 1.2 hours
C. 2.4 hours D. 3.0 hours
4. A flow of 280 gpm is pumped against a total head of 175 feet. If the efficiency of the pump is 65% and the efficiency of the motor is 90%, what is the horse power?
A. 33 Hp B. 27 Hp
C. 21 Hp D. 18 Hp
5. What typically happens to the process SRT when the WAS rate is increased?
A. SRT decreases
B. F/M ratio decreases
C. SRT increases
D. SRT remains the same
6. What may be the most common cause of filamentous bulking in a secondary clarifier?
A. Aeration D.O. too low
B. SRT too low
C. RAS rate too high
D. Aeration D.O. too high
7. What may be the best adjustment to make is pin floc in the clarifier is increasing TSS in the effluent to unacceptable levels?
A. Increase the SRT
B. Decrease the F/M ratio
C. Decrease the SRT
D. Decrease the WAS rate
8. What may be the most probable cause for slow settling MLSS?
A. High RAS rate
B. Filamentous bacterial growth
C. Balanced F/M ratio
D. Low sludge blanket
9. What process control parameters is the result of aeration total solids inventory divided by the total solids removed from the process?
A. Gould sludge age (GSA)
B. Solids retention time (SRT)
C. Mean cell residence time (MCRT)
D. Sludge yield
10. Which type of bacteria must have free dissolved oxygen to survive?
A. Anaerobic B. Anoxic
C. Facultative D. Aerobic

“Through Condition Monitoring we’re able to find the problems before they become a major shutdown.”

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Brett Horne, General Superintendent, Hogan & Associates Construction

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

Wastewater Puzzle

Find these words

- | | | | | | | |
|-----------|-----------|--------------|--------------|---------------|-----------|---------------|
| AERATION | CHLORINE | DISINFECTION | FLOCCULATION | MAINTENANCE | OPERATION | PRETREATMENT |
| BIOSOLIDS | CLARIFIER | EFFLUENT | INFLUENT | NITRIFICATION | OXIDATION | RECIRCULATION |
| CAPACITY | DIGESTER | FILTER | LABORATORY | NUTRIENTS | PATHOGEN | |

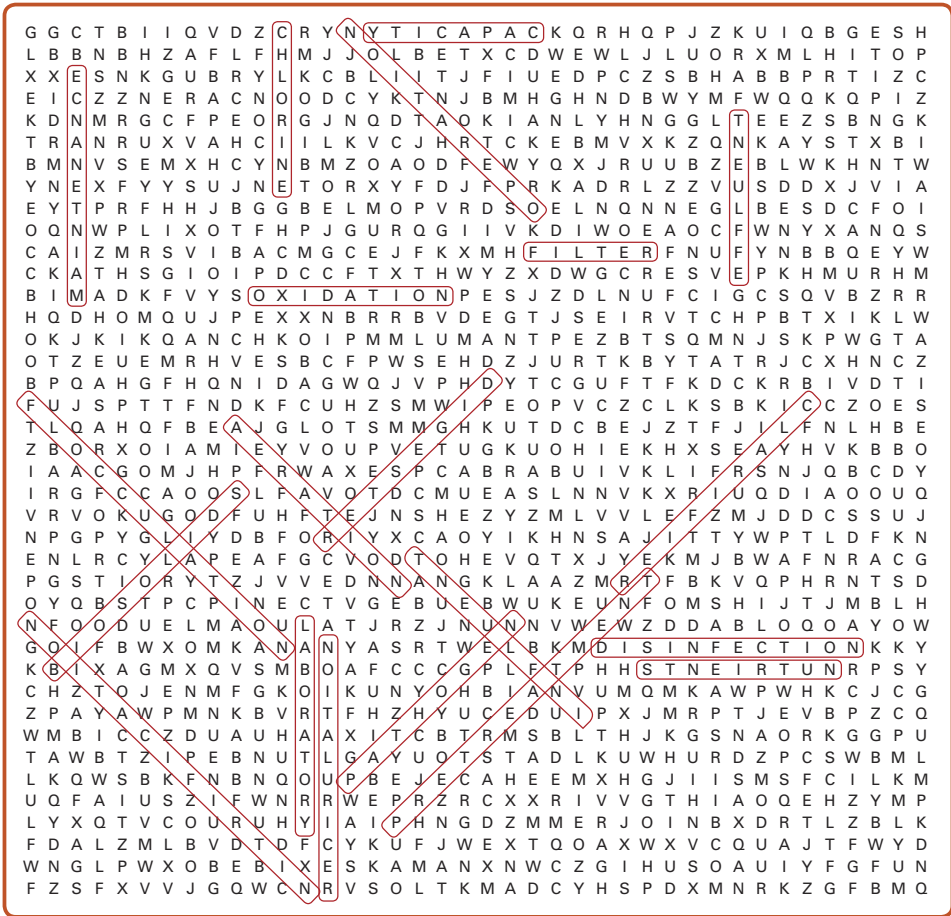
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Solution on reverse.

Wastewater Puzzle Solution

(Over,Down,Direction)

- AERATION(10,19,SE)
- BIOSOLIDS(2,30,NE)
- CAPACITY(23,1,W)
- CHLORINE(12,1,S)
- CLARIFIER(35,18,S)
- DIGESTER(21,17,S)
- DISINFECTION(26,29,E)
- EFFLUENT(32,12,N)
- FILTER(23,11,E)
- FLOCCULATION(1,18,SE)
- INFLUENT(25,32,NW)
- LABORATORY(13,28,S)
- MAINTENANCE(3,13,N)
- NITRIFICATION(13,40,NW)
- NUTRIENTS(36,30,W)
- OPERATION(23,9,NW)
- OXIDATION(11,13,E)
- PATHOGEN(15,35,NE)
- PRETREATMENT(17,37,NE)
- RECIRCULATION(14,40,N)



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WEAU night out at Salt Lake Bees game

WEAU celebrated a Family Fun Night at the Salt Lake Bees baseball game on Friday August 30th. This has become an annual tradition. 72 WEAU members and their families attended and a great time was had by all. For just \$10 each, WEAU members were treated to a baseball game, a buffet-style dinner above the first base line, and a raffle for \$1,000 in prizes during the 7th inning stretch with the grand prize being a Samsung Tablet.



Thank you to the Young Professionals Committee for organizing this wonderful event!

Make sure not to miss out on any future WEAU events, and sign up for the email list by sending an email to membership@weau.org. Also, the WEAU Young Professionals and Students

Group (YPS) has an email list. Please sign up using the form at: <http://www.weau.org/who-we-are/young-professionals>. 








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To reach Utah's water industry professionals through the *Digested News* magazine and its targeted readership, contact Chad at your earliest convenience to discuss your company's promotional plans.

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10110100101011010
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0101
    
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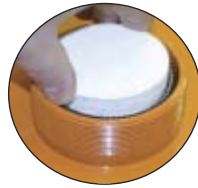
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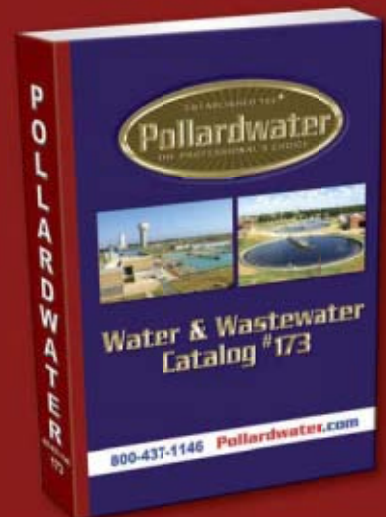
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