

Plant Spotlight: The City of Pompano Beach

Author: Frank Brinson, P.E., McCafferty Brinson Consulting, Principal Engineer

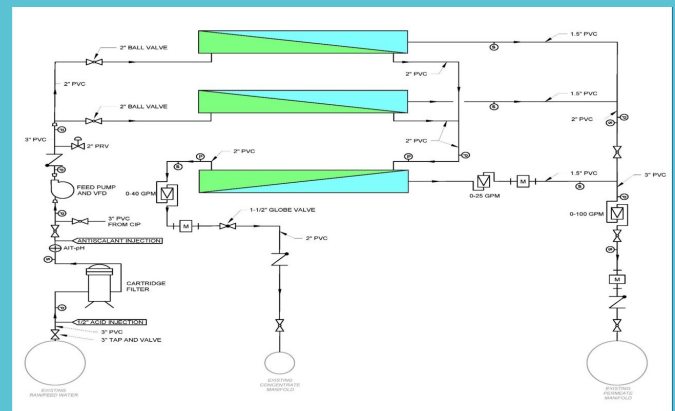
The City of Pompano Beach serves approximately 84,000 drinking water customers in Broward County using a combination of conventional lime softening and nanofiltration (NF) (or membrane softening). The lime softening plant is a 40 million gallon per day (mgd) facility, while the NF plant has a capacity of 10 mgd. The NF plant was constructed and placed on line in 2002, and the original NF membrane elements were replaced in 2009 as part of the City's routine, periodic membrane element replacement program. In preparation for the next membrane element replacement, the City's operations staff designed and constructed a pilot plant that uses three full-size (8-inch diameter, seven element) membrane pressure vessels in a 2:1 array. The pilot test unit was permitted through the Florida Department of Health in Broward County, and permeate is recovered into the full-scale plant permeate header system.

Because the test unit uses pressure vessels and membrane elements that are identical to the NF plant's full-scale membrane units, in a nearly exactly proportional membrane array, the unit is a true and accurate pilot-scale representation of the full-scale NF process. An accurate representation of the critical membrane operating parameters, performance, and potential fouling characteristics was critical, because the City wanted to validate satisfactory performance of potential replacement membranes, as well as evaluate the membrane selections to optimize the process with respect to power and pretreatment chemical long-term operating costs.

Over the last year, the City has conducted extensive pilot testing of potential replacement membranes. Under the pilot testing program, the City has tested membrane element selections from two membrane element manufacturers, as well as tested two combinations of chemical pre-treatment regimens at different membrane recovery rates and average flux (loading) rates. Membrane selections from



Pompano Beach Full Scale NF Plant



Process Flow Diagram for Pilot Unit



Pompano Beach NF Pilot Unit

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Message From The President

Dear SEDA Members,

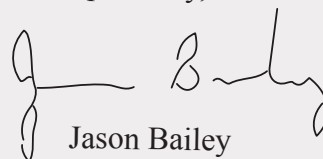
By the time you receive this issue of the Recovery Zone many of us will have just enjoyed some time together at our annual Spring Symposium in Daytona Beach, Florida. We hope that you enjoyed the Symposium and came away from the event enriched with an increased knowledge of membrane treatment, some good memories, and a few new friends. The Spring Symposium is SEDA's largest event of the year and the Program Committee worked diligently to plan and orchestrate the details of this year's symposium with weekly conference calls that started a little less than one year ago. A big thank you goes out to the Program Committee and the SEDA Administrator, Miller Business Services for a job well done! In addition to planning the Spring Symposium, the Program Committee has also been planning to bring the SEDA Fall Symposium back this year (2019). The Fall Symposium will be held in Virginia Beach, Virginia October 1-3, 2019.

This is my last President's Message. Ron Castle was affirmed as SEDA's next President and will take the wheel and provide leadership for the SEDA Board of Directors after the Symposium. These last two years serving as your SEDA President have been enjoyable and productive as we have maximized the number of MOC schools and Technical Transfers being offered annually. SEDA membership has remained strong. The Board launched the SEDA APP during my term as president and it has proven to be a great tool for staying updated on SEDA events and sharing information and photos. I want to thank each SEDA member who has volunteered this year to serve on a committee, or teach at a MOC school/tech transfer workshop, or host a MOC school/tech transfer workshop, or write an article for the SEDA newsletter, or attend one or more SEDA events, or any of the many other ways many of you have stepped up to serve and support this great organization.

I appreciate everyone who continues to help achieve the goals of SEDA. For those who are interested in serving on a committee or assisting in any way with SEDA, I would encourage you to visit the website at <https://www.southeastdesalting.com/committees/> and speak to the committee chair of interest. You don't have to be a board member to serve on a committee and the committee chairs appreciate and enjoy membership involvement on their committees. It reassures the Board that they are fulfilling the needs of the membership.

Thank you and I look forward to seeing everyone at future events.

Respectfully,


Jason Bailey

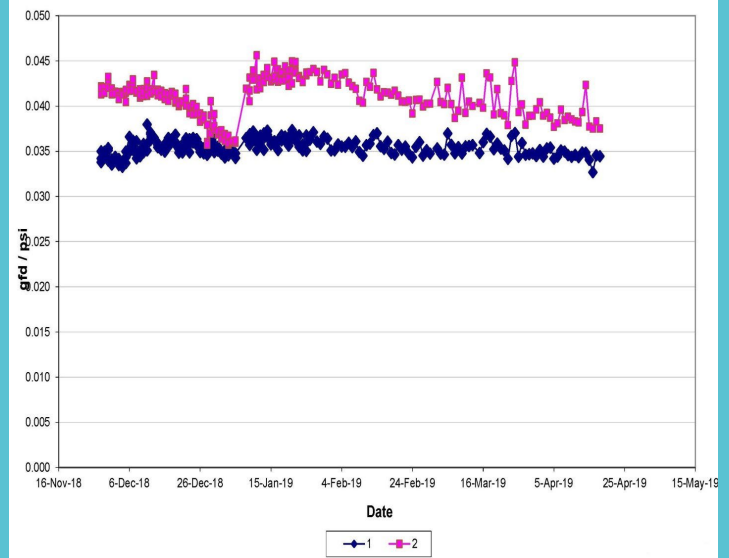


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the two tested membrane element manufacturers were prequalified for procurement of the replacement membranes through competitive bidding, and the pilot testing has shown promising results for the possibility of completely eliminating both acid and antiscalant pretreatment, potentially saving the City hundreds of thousands of dollars annually in chemical costs.

The City is now preparing to initiate the bidding and procurement phase of the project. It is expected that the City staff's detailed preparation, hard work, and investment in the pilot test unit and testing program will be repaid many times over in the coming years with the replacement membranes through stable, efficient operations and reduced chemical and power costs.

Specific Flux (1st and 2nd Stages)



Jason Mraz, Tom Dineen, and Jesus Marrero of the City of Pompano Beach



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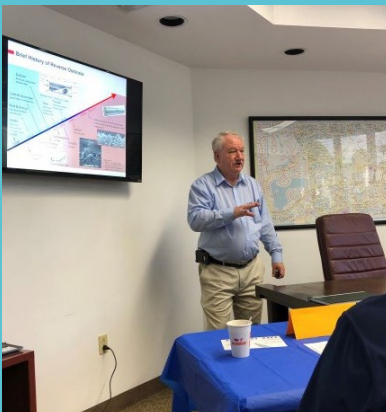
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Technical Transfer Workshop Review

Author: Karla Berroteran-Castellon, Water Treatment Plant Superintendent, Village of Wellington, Tech Transfer Comm Chair

On Tuesday April 2nd, 2019, a workshop entitled Water Quality and Energy Efficiency through Membrane Selection was held at the Coral Springs Improvement District Reverse Osmosis (RO) plant. The class had a total of 17 participants. The class was taught by four instructors: Alan Sharpe of Lanxess, Steven Coker of Dupont/Dow, Susan Guibert, P.E. of Toray Membrane USA, and Kirk Lai of Hydranautics.

The morning started out with Alan Sharpe explaining some fundamentals of membrane permeability and salt rejection. He showed the attendees how membranes from different manufacturers could be compared, and explained why salt rejection values on a spec sheet had to be considered within the context of the membrane test conditions. Steven Coker then gave a talk explaining how different membranes could be combined within the same system, or even within the same stage, to achieve a certain water quality. He used some case studies to illustrate how certain plants could benefit from using such hybrid systems. Susan Guibert talked about the use of microfiltration (MF) and ultrafiltration (UF) membranes as pre-treatment for RO systems, especially in water reuse applications. She highlighted the fact that RO membranes cannot be integrity tested and that the use of MF/UF is therefore essential for getting log removal credits in indirect potable reuse (IPR) or direct potable reuse (DPR) applications. Kirk Lai gave the final talk of the day with a presentation about energy recovery devices. He discussed the different types and explained how these devices help balance the flux within a reverse osmosis system while reducing energy consumption. Troy Lyn of Globaltech made a guest appearance and provided an overview of the work being done at the Coral Springs Improvement District water plant. Troy talked about the current membrane replacement project that Globaltech assisted Coral Springs with and water quality associated with the membrane skid modifications. Workshop attendees then went on a tour of the Coral Springs Improvement District RO plant hosted Joe Stephens, Chief Operator.



Steven Coker, Dupont/Dow



Alan Sharpe, Lanxess



Kirk Lai, Hydranautics



Susan Guibert, Toray Membrane

DUPONTTM

LANXESS
Energizing Chemistry

TORAY
Innovation by Chemistry



Troy Lyn, Globaltech



Coral Springs Improvement District Plant Tour



Plant Tour - Extended

On April 25, 2019, another workshop entitled Operation & Maintenance of Raw water Supply Wells for Membrane Treatment was hosted at the Village of Wellington water plant. The class had a total of 12 participants. The class was taught by Caroline Faulkner Smith and Jim Andersen, both from JLA Geosciences, Inc.

Jim Andersen provided an overview of well theory, design, construction methods, development methods and standard testing approaches. Workshop attendees participated in hands-on training taught by Caroline. The class was split in two smaller groups of six for the hands-on portion. Caroline demonstrated how to properly set-up a silt density index (SDI) manifold, the Rossum Sand tester on the well head, and how other water quality equipment and well performance data collection equipment should be set-up at the wellsite. All tests were performed on Well R1 located on Wellington's plant site. Participants performed water quality testing and learned how to use well performance testing equipment. The students collected actual data and physically used the equipment themselves. At the conclusion of the hands-on session participants returned to the class room where Jim gave instruction on evaluating well performance data, problem solving, monitoring data and, identifying trigger points for well rehabilitation. At the conclusion of the day Jim and Caroline answered questions regarding well performance at different plants and discussed the results from the field testing. Karla Berroteran, WTP Superintendent of the Village of Wellington took attendees on a well construction site visit and a tour of the Wellington water plant.



Hands-on Training with Caroline Faulker Smith



Classroom Instruction with Jim Andersen

The Traveling Troubleshooter: Time to reconsider changing the Timer... or Not...

Author: Anonymous

New Chief Operator Youngsouls and Operator Allwips looked at each other in a total “Oh Wow” moment as they realized what was causing their recent untimely and frequent cartridge filter change-outs.

Stubbs Gripschtik could see from their reactions; they understood his analysis. He had listened to Youngsouls and Allwips describe the issue and what they did to track down the problem. A very impressive and spot on effort, Stubbs thought, being new operators in an unfamiliar plant and all, but they missed the cause. Why was it happening?

Stubbs had the answer without having to leave the control room. He proceeded with a smile, “Most control systems have a few timers that assist in the sequences of operation, say during startup and shutdown. In this case, the system has controls and a timer for the Well feedwater to be diverted to waste for a specific time period, prior to being allowed to “Pre-Flush” the RO Unit, which has its own timer/time period.”

“During startup, some wells produce a slug of sandy and/or silty feedwater which is undesirable for the RO. At some point when the RO Facility and Well was first put online, the Well water was tested for silt; this testing determined how long it took to clear the slug of silt or sand from the feed water. Knowing this length of time allowed a system control timer to be set to flush the Well to waste and clear the slug.”

“Sometimes you must reach into a panel and turn the timer dial, flip its switches or use an Operator Interface such as a mouse or touch screen to change the setting on a timer. And sometimes you don’t have access to change it at all.”

“Arbitrarily changing the timer could have unintended consequences since it was set using a fairly solid scientific method for a specific purpose. The Well flush timer, you told me, was originally set at 20 minutes and had been reduced several times and is now set at 5 minutes.”

And that’s when the lights came on. Chief Youngsouls and Ops Allwips looked at each other accusingly and smiled, each pointing a finger as to who changed the well flush timer. They may have thought by reducing the flush time they would be saving water, energy, and/or maybe startup time. However, reducing the timer allowed part of the silt and sand slug to enter the feed piping every time the well started, ending in early and often cartridge filter replacement.

“Original Well flush settings should be checked and updated based on periodic SDI testing at the wellhead. Individual well feedwater SDI testing is your first line of defense when protecting your membrane systems.”

Gripschtik-y Note: You know what to do; check the well flush and timer; check the well SDI during startup, record data and observations; adjust if required: repeat.

For Systems that have a Well Flush to waste; Lucky you. 😊



Well SDI pad on the left; taken at five (5) minutes into the flush.

Well SDI pad on the right; at twenty (20) minutes into the flush.



Membrane Operators Certification (MOC) Update

Author: Chris Ballard, Toray Membranes USA, MOC Comm Chair

The SEDA Membrane Operator Certification (MOC) School Module I introductory course to membrane systems was presented March 19-21st, 2019, at City of Port St. Lucie, Florida Prineville Water Treatment Facility. Distinguished instructors for the course included Lance Littrell and John Potts from Kimley-Horn and Associates Andrea Netcher from Tetra Tech, and Mo Malki from American Water Chemicals. Topics that the 2 ½ day course covered were introduction to membrane processes, water supplies for membrane systems, water chemistry, chemical treatment, post-treatment, and mechanical components of membrane systems. City of Port St Lucie staff including Dan Burdett, Tim Vanasdale, Bilmer Serrano, and Jeff Golden provided impressive tours of both the Prineville and James E. Anderson Reverse Osmosis Water Treatment Facilities giving opportunity for the class of twenty-four operators to ask additional questions to supplement the classroom instruction. Sponsors for the course were Kimley-Horn and Associates, American Water Chemicals, and Toray Membrane USA, Inc.



Classroom Training with Andrea Netcher



Plant tour

Please contact SEDA's administrator at admin@southeastdesalting.com if you are interested in hosting or have recommendations for future MOC School locations. A minimum of 12 attendees must be registered to hold a class so reach out to other facilities in your area to see if they are also interested. Check the Upcoming Events section of this newsletter and the SEDA website for other SEDA events already on the calendar for the remainder of 2019.



Module I Exam Day



Special recognition to the City of Port St. Lucie for being the host facility

Surficial Aquifer Well Rehabilitation Case Study

Author: Jon Friedrichs, P.G., JLA Geosciences, Inc.

In South Florida, well rehabilitation is a necessity to maintain production and suitable water quality from Surficial aquifer production wells, especially when supplying membrane treatment plants. Declines in well performance can often be attributed to some combination of mineral scaling and biological fouling of the production zone which can be seen on well screens, casings, gravel pack, and borehole walls. These mineral buildups and biological growths also extend deeper into the formation to block off groundwater flow pathways that results in decreased well performance that is difficult to correct. Typical well rehabilitation efforts use a combination of mechanical cleaning (brushing, swabbing, jetting, etc.) and chemical treatment (acid and chlorine) techniques to improve well performance and remove mineral scale and biological growths. These rehabilitation efforts often require the well to be taken out of service for long periods of time and often have high costs associated with them.



32% Hydrochloric Acid

An alternative well rehabilitation approach has been successfully implemented in several surficial aquifer production wells in Palm Beach County with good results. The approach was designed to minimize costs and reduce rehab times by injecting large volumes (30,000 – 50,000 gallons) of low concentration hydrochloric acid (1%-3%) and chlorine (200ppm -250ppm) solutions into the well without breaking the wellhead seal and removing the permanent well pump. Costs are approximately half of a typical well rehabilitation because it eliminates the need to remove the wellhead, pull the pump, mobilize heavy equipment, well development with contractor supplied equipment, reinstallation of pump and wellhead, and site restoration. The large volume, low concentration hydrochloric acid injection typically takes between 10 and 12 hours to complete. The long pump duration extends the period of time where fresh acid solution is flowing past and working on the hardness scaling in the borehole, screen, gravel pack and formation. Another observed advantage of utilizing the large volume, low concentration hydrochloric acid solution is the treatment of post acid discharge water was not necessary because the solution neutralized in the formation to a pH of six (6) or higher. Attaining the right acid blend ratio is important for an effective treatment that both provides improvement in specific capacity and eliminates the need for neutralization of discharge water.

The rehab setup included installation of PVC tubing through a 2-inch diameter port in the wellhead to an appropriate depth below the pump.



Discharge Setup

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Wellhead with Acid Injection Line

Between 30,000 and 50,000 gallons of a 1% to 3% hydrochloric acid solution was pumped into the well through the installed tubing. The acid was allowed to sit in the well for approximately 12 hours after acid injection was finished before being purged out using the permanent well pump. Following acid treatment, the well was treated with 50,000 gallons of a 200-250 ppm chlorine solution to treat biological growths in the well and formation. The chlorine solution was allowed to sit in the well for approximately 12 hours before being purged out using the permanent well pump. Following chlorination the well was pumped to ground for several days using the permanent well pump. Well performance and water quality testing including Rossum sand testing and SDI's were performed prior to placing the well back into service. Results from the large volume low concentration acidization and chlorination procedure yielded specific capacity increases between 117% and 322% when compared to the pre-acid specific capacities at the same pumping rates.

This type of rehabilitation could be an effective tool to utilize in underperforming wells and wells with a history of biological problems. Since it does not require the use of heavy equipment water utilities may be able to performing this type of work in house or with a contractor as a cost effective maintenance type of rehabilitation.



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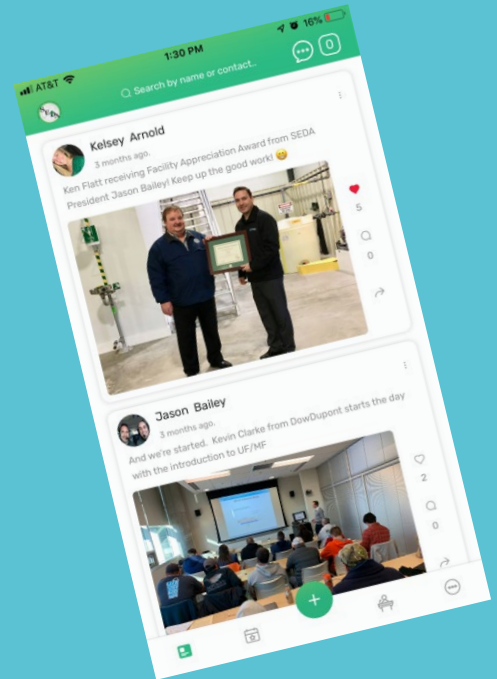
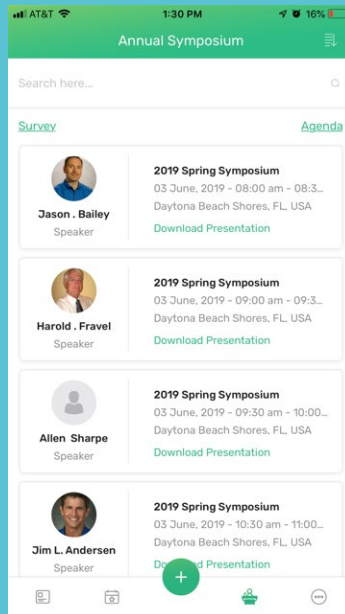
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MEMBER SPOTLIGHT

How long have you been a member of SEDA?

I joined SEDA in October of 1997, almost 22 years ago!

Why did you join SEDA?

I had heard thru the grapevine, that there was a new organization offering membrane training. As it was explained to me then, SEDA held the training in really cool places and at nice hotels. It was also a rumor that membrane plant operators might be required to get an additional license from DEP. If that was true, I wanted to be ready.

What is something that you have gained/or hope to gain by being a member of SEDA?

I gained a great career thru the training and relationships that developed with other SEDA members and people working in this industry. I gained the confidence and ability to operate very complex facilities. Nobody else was offering this. I found an organization that I believed in, one that cared about Operators, whose leadership was friendly, approachable and was family friendly.

How did you get involved in the Water or Wastewater Industry?

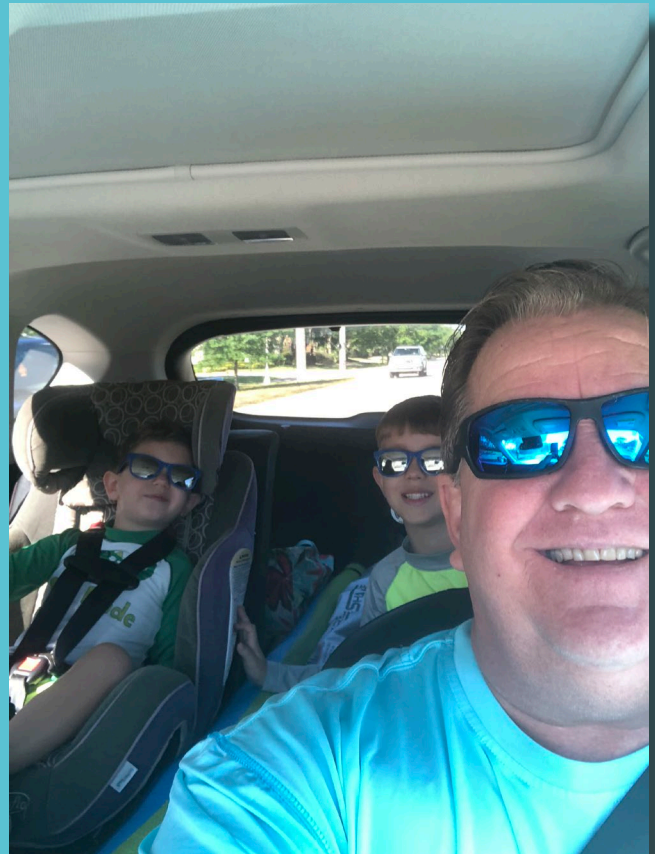
I came to Florida in 1987 with my wife, two children and a broken down car at the ripe old age of 27. I was working two full time jobs, just trying to get a new start. I was working in water distribution for the City of Pompano Beach and also at a resort on the beach as a maintenance man. One of my jobs at night at the resort was to take care of the pool and Jacuzzi. It was while trying to take care of that pool and Jacuzzi that I began to understand the basics of water treatment. There was a water plant for the city, so when a position opened up at the water plant for a Maintenance Dept. service worker, I applied but did not get the job. Nope, bummer. Eventually, I kept applying and got myself in the door at the water plant. The rest as they say is history! To date, I have operated, maintained and/or managed 18 water plants and 7 wastewater plants. I got involved!

What is the most recent book you have read or concert you have been to?

The most recent concert I have been to was STYX a couple of years ago.

What activities do you enjoy in your free time?

Oh my, well let's see. I love anything outdoors, hiking, camping, swimming and snorkeling in freshwater springs. I enjoy taking naturalist classes, especially thru the Florida Master Naturalist Program from the University of Florida. I am a certified Advanced Master Naturalist, and Land Steward. I love nature photography and most of all I love spending time with my two children and five grandchildren. Also, I have been singing and playing the guitar and other instruments since I was about 10 years old. I played in high school bands, and recently in some old fart bands! I never took music lessons, so I'm not that good at it, but I love music. I have a huge music collection, a collection of guitars, and a self-made studio in my man cave. My grandkids love to sing, dance, and play instruments in Papa's Music Room. My neighbors love it too...thankfully one of them is a drummer!



Tony Fogel

WELCOME TO OUR NEW MEMBERS



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GREATER PINE ISLAND WATER ASSOCIATION

JUAN AROSEMENA

PINELLAS COUNTY SOLID WASTE

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JAWS

Legislative Update

Author: Pierre Vignier, City of Port St. Lucie, Legislative Comm Chair

On February 14th, 2019, the Environmental Protection Agency (EPA) and the Department of the Army published for public comment a proposed rule for redefining of jurisdictional Waters of the U.S. (WOTUS) for federal regulation under the Clean Water Act (CWA) comments on the proposed rule change were accepted until April 15th, 2019. The stated goal is to provide a definition of WOTUS that will protect the nation's navigable water, help sustain economic growth, and reduce barriers to business development.

Some portions of the definition of WOTUS will not be changed. The proposed rule outlines what are considered WOTUS as traditional navigable water; tributaries to those waters; certain ditches, lakes, and ponds; impoundments of jurisdictional waters; and wetland adjacent to jurisdictional waters. The proposal also establishes what are not WOTUS such as waters not meeting one of the preceding jurisdictional categories; ephemeral streams; groundwater; many ditches; prior converted cropland; stormwater control systems and wastewater recycling structures; wastewater recycling structures; and waste treatment systems.

This rule rescinding or revising pursues a February 28, 2017 Executive Order 13778, Restoring the Rule of Law, Federalism, Economic Growth for consistency with policy. These changes may be considered for time and cost savings to projects as well as potential impacts from removing ephemeral streams and wetlands not connected by surface waters of WOTUS. For more information on the proposed rule, please visit at link

<https://www.regulations.gov/document?D=EPA-HQ-OW-2018-0149-0003>



SEDA QUIZ

By: Brian Matthews, City of Palm Coast

1. Microfiltration membranes remove ____% of the dissolved solids in the water
 - A. 25
 - B. 0
 - C. 40
 - D. 100
2. NaOCl stands for?
 - A. Sodium Hydroxide
 - B. Sodium Fluoride
 - C. Sodium Chloride
 - D. Sodium Hypochlorite
3. Which membrane process listed below does NOT act as a barrier in removing suspended solids, microorganisms, or organics?
 - A. UF and MF
 - B. RO and NF
 - C. ED and EDR
 - D. IX
4. Alkalinity includes:
 - A. Bicarbonate
 - B. Carbonate
 - C. Hydroxide
 - D. All of the above
5. Membrane fouling is:
 - A. Biological deposition on the membrane
 - B. Chemical deposition on the membrane
 - C. Colloidal deposition on the membrane
 - D. Any deposition formed on the membrane
6. Which of the following is NOT used to determine the Langelier Saturation Index?
 - A. Total dissolved solids
 - B. Temperature
 - C. Alkalinity
 - D. Total suspended solids
7. Solubility of a salt is important because:
 - A. It affects the recovery rate of a membrane system
 - B. It can determine proper cleaning solutions
 - C. Scale can increase production costs
 - D. All of the above
8. Recovery is defined as:
 - A. The ratio of the permeate flow to the feed flow
 - B. The ratio of the feed flow to the concentrate flow
 - C. The ratio of the concentrate flow to the permeate flow
 - D. The ratio of the permeate flow to the concentrate flow
9. Using cross-flow filtration, _____ stream passes through the membrane:
 - A. A portion of the feed
 - B. All of the feed
 - C. None of the feed
 - D. A portion of the concentrate
10. Who should receive chemical safety training?
 - A. Only the Chief operator
 - B. Only the Shift operator
 - C. Only the first responders
 - D. Everyone who works with chemicals

Answers can be found on the SEDA website at <http://www.southeastdesalting.com/members-only/quiz/>



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- ◆ Control System Upgrading
- ◆ Energy Recovery and Optimization
- ◆ Concentrate Disposal

SEDA Training and Events Schedule

June

Tuesday, June 25th, 2019
Tech Transfer Workshop
Feedwater Supply and Pretreatment
City of Clearwater, FL

**Tuesday - Thursday
October 1st - 3rd, 2019**
Fall Symposium
Virginia Beach, VA

July

July 9th - 11th, 2019
Tuesday - Thursday
Membrane Operator Certification
Module 1 (Introduction to Membrane
Systems)
Pompano Beach, FL

Call For Speakers

If you are interested in
presenting, please email
Michele Miller at
admin@southeastdesalting.com

July 23rd - 25th, 2019
Tuesday - Thursday
Membrane Operator Certification
Module II (Advanced Membrane System
ICO/NF)
Jupiter, FL

TBD September, 2019
Membrane Operator Certification
Module IV (Membrane Bioreactor Systems)
Bonita Springs, FL

TBD, 2019
Membrane Operator Certification
Module 1 (Introduction to Membrane Systems)
Pinellas County, FL

November 19th - 21st, 2019
Tuesday - Thursday
Membrane Operator Certification Module III (Low
Pressure Membranes MF/UF)
Palm Coast, FL

November



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Inside Recovery Zone

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SAVE THE DATE 2019 SEDA FALL SYMPOSIUM VIRGINIA BEACH

OCTOBER 1ST - 3RD, 2019

WE'RE HERE



1 1/2 DAY SEMINAR & PLANT TOUR

ONLINE REGISTRATION OPENING SOON