RECOVERY ZONE
APRIL 2020

Hardening of FPUA Water Treatment Systems

Authors: Keith Stephens, Water Resource Superintendent, FPUA
Steve Murto, Operations Supervisor, FPUA, Troy Lyn, PE, Globaltech

The Fort Pierce Utilities Authority (FPUA) provides potable water to the incorporated section of the City of Fort Pierce (City), and the surrounding areas of unincorporated St. Lucie County including South Hutchinson Island to the Martin County line. FPUA also provides bulk water to North Hutchinson Island, northern St. Lucie County, and western St. Lucie County. FPUA currently serves approximately 21,100 water accounts within the FPUA's service area excluding bulk customers with an area of approximately 61 square miles. FPUA has two potable water interconnects, one with Port St. Lucie Utilities and another with Martin County Utilities, that are used only for emergency purposes. Since 2002, FPUA has embarked on several projects to improve, harden, and increase the reliability of its potable water system which are highlighted below.

Treatment Facilities

The FPUA treats groundwater at its Henry A. Gahn Water Treatment Plant (WTP). The original treatment process at the WTP was a standard 20-million gallon per day (mgd) lime softening (LS) plant originally constructed in 1963 and expanded in 1970 and again in 1975. In addition to the LS facilities, a low-pressure reverse osmosis (LPRO) membrane treatment system was constructed in 2000 and expanded in 2005. The plant is currently permitted at 23.32 mgd with 12.99 mgd permitted for the LS plant and 10.33 mgd permitted for the LPRO plant. A brief description of facilities that exist today follows.

Figure 1: Floridan Aquifer Well FA-7

Figure 2: Membrane Building (Upper Left), Lime Softening Units/Filters (Right), and Lime Sludge Thickener (Lower Left)

Raw Water Supply

FPUA currently owns and operates a total of 46 groundwater wells, including 36 surficial aquifer wells and 11 Floridan Aquifer wells. The surficial aquifer wells supply water to the LS plant. One Floridan Aquifer well is dedicated to the LS plant. Three other Floridan Aquifer wells can also be routed to the LS plant. Ten Floridan Aquifer wells are normally dedicated to feed the LPRO plant.

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Message From The President

Dear SEDA Members,

Happy New Year! This is our first Recovery Zone of 2020, our committees have been very busy so far. Our Awards Committee has reviewed our application and made some updates. The application process has also gone digital, so all submissions will be electronic this year. Please make sure you nominate your plant and one or more of your outstanding co-workers. You can find the forms on the website. The winners will be featured in the Summer Newsletter, in our mobile app and on our website.

I am excited to announce the launch of the new SEDA Online Member Portal! The Membership Committee reviewed several companies and chose Member Clicks to host our Members Only Portal. The new online portal allows members to easily pay dues, update their profile, register for events, stay updated with new information, and much more. I invite you to check it out and take advantage of all its features www.SEDA.Memberclicks.net.

As spring is coming upon us, the Program Committee has been working diligently in preparation for the Spring Symposium, unfortunately, after several weeks of careful consideration and with great sadness, we have decided to cancel the SEDA 2020 Spring Symposium May 31 – June 3 in Cape Coral.

The health of our members, volunteers and staff is most important. With the coronavirus pandemic still unfolding, we are being asked to avoid travel and to practice social distancing. It's uncertain when these guidelines might change. With the conference less than 7 weeks away, it is hard to imagine a scenario in which we could move forward with full confidence.

Please take care and be safe.

Sincerely,
Ronald J Castle II, PE

SEDA President,
Harn R/O Systems

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Lime Softening Plant

Lime softening is provided by two 70-foot diameter softening units with hydraulic capacities of 13 and 15 mgd. After lime softening, the partially treated water is then pumped to four air strippers to increase oxygen in the water. The aerated water is then pumped to 10 multi-media filters. The filtered water gravity flows into three interconnected clearwells. Four clearwell transfer pumps convey the water to three ground storage tanks (1 MG, 1.5 MG and 3.0 MG). Chlorine is added to the filtered water in the transfer line to form free chlorine for four-log disinfection. In the transfer line, from the clearwell to three ground storage tanks, water from the LPRO plant is blended and ammonia, fluoride and corrosion inhibitor is added. Ammonia is added to form chloramines for residual disinfection in the distribution system.

LPRO Membrane Plant

The existing 10.33 mgd reverse osmosis plant facilities consists of a membrane process building, chemical building, bulk chemical storage facilities, degasification/off-gas scrubber system with a clearwell, and a deep injection well. Raw water enters the RO WTP from Floridan Aquifer production wells. As water enters the plant from the wells, sulfuric acid can be added to lower pH. The water then travels through three (3) one-micron nominal rated cartridge filters.

Following cartridge filtration, the water can be divided into two streams, membrane bypass and membrane feed flows. The membrane bypass does not travel through the membrane trains but is blended with permeate and sent to the degasifiers to remove hydrogen sulfide. Scale inhibitor is added to the membrane feed after cartridge filtration. Following the addition of scale inhibitor, the membrane feed can travel to either the suction side of the high-pressure membrane feed pumps or be discharged to the deep injection well if certain pretreatment conditions are not met, and during startup. Variable speed membrane feed pumps boost the water pressure prior to the membrane trains. Each membrane train is equipped with a dedicated membrane feed pump. The membrane permeate (treated water) travels from the membrane trains to the degasifiers where it is blended with the membrane feed bypass. Two of the membrane trains have a capacity of 2.25 mgd while the third train is rated for 3.25 mgd. The trains can produce up to a total of 7.75 mgd of membrane permeate. The LPRO plant can blend raw water up to a ratio of 3:1 (2.58 mgd) to produce a total of 10.33 mgd of finished water from the LPRO plant. Prior to the degasifiers, sulfuric acid is added to the blended stream to reduce the pH and to assist in the removal of hydrogen sulfide. In the degasifiers, hydrogen sulfide and carbon dioxide are stripped from the blended flow. Chlorine solution is added at the bottom of the degasifier to oxidize any remaining hydrogen sulfide before the degasified water enters the clearwell and to provide free chlorine four-log disinfection. Sodium Hydroxide can be added to the LPRO clearwell, if additional pH control is needed. Three transfer pumps pump the degasified water from the RO clearwell to the ground storage tanks. During transport to the ground storage tanks and after blending with lime softened water, corrosion inhibitor is added to reduce the corrosivity of the LPRO treated water. As the degasified water flows to the ground storage tanks, it is blended with the lime softened water from the lime softening plant.

The LPRO concentrate waste stream is disposed of in a deep injection well.

Figure 3: LPRO Train A

Figure 4: Feed Sample Panel and Cartridge Filters

Figure 5: Deep Injection Well

Hardening and Reliability Improvements

Prior to 2002, the LS plant was permitted to operate at 20.0 mgd based on the rated capacity of the lime softening units and filters. Once the LPRO plant was built, FDEP questioned the permitted capacity of the entire facility as the LPRO plant was built to supplement the LS plant during drought conditions. Following a number of discussions with FDEP, the overall plant rating for the facility was lowered to 13.8 mgd, primarily due to source water limitations. In 2005, FPUA set a goal of reducing the dependence on the lime softening plant as well as increasing the reliability of all the treatment facilities. With Globaltech's assistance, FPUA looked at establishing "reliability criteria" similar to the Class I Reliability criteria utilized for wastewater plants as no reliability criteria currently exist for water plants. The following paragraphs provides a description of the actions taken by FPUA to increase permitted capacity, improve reliability and harden the plants.

Raw Water Supply

As of 2002, approximately 50% of the surficial aquifer wells had been in service for 30 to 40 years. The surficial wellfield suffered from low capacity wells that limited the treatment capacity of the lime softening plant to less than 9.99 mgd. Some surficial wells were also vulnerable to sanitary hazards due to their proximity to roadways. To improve the reliability of the wellfield, FPUA embarked on a program of well replacement and annual cleaning and rehabilitation. Since 2005, seven replacement surficial wells have been constructed and four wells have been permanently abandoned or demolished. FPUA to this day continues to rehabilitate and replace their surficial aquifer wells and their surficial wellfield capacity is now over 15 mgd. Because of these improvements made to their surficial aquifer wellfield, FPUA was able to increase the LS plant capacity to 12.99 mgd.

Prior to 2005, the existing Floridan Aquifer well capacity was 6.91 mgd. Two new Floridan Aquifer wells were installed in 2008 to increase the capacity of the LPRO system to 10.33 mgd.

Lime Softening Plant

The 50-year old LS plant has undergone a number of improvements since 2005 to improve the reliability of the LS plant. The improvements include the rehabilitation of both softeners, 10 filters, three clearwells, replacement of four LS clearwell transfer pumps, replacement of two backwash pumps, and refurbishment of the gravity thickner. These improvements should allow the LS plant to continue to reliably operate for the coming decades.

Low-Pressure Reverse Osmosis Plant

The original LPRO plant was constructed in December 2002. It consisted of two (2) 2 mgd membrane trains with one degasifier, with expansion space planned for a total of 6 mgd. With raw water bypass blending of 3:1, the plant was rated at 5.33-mgd but had no firm or permitted capacity established as the LPRO plant was designed and constructed to supplement the lime softening system during periods of drought using the Floridan Aquifer. Many of the redundant equipment that would have been provided for firm capacity as an individual LPRO plant was not included in the original construction.

Figure 6: Degasifier Clearwell with Transfer Pumps

Figure 7: Off Site Surficial Aquifer Well

Following the reliability study in 2005, the LPRO plant was slowly retrofitted to increase the firm/permitted capacity of the LPRO plant within the existing building footprint. The LPRO plant firm capacity was raised from 0 mgd to 6.0 mgd and then to the current rating of 10.33 mgd. The first expansion phase to increase the LPRO firm capacity to 6.0 mgd included the installation of a membrane feed piping manifold, installation of a 3rd membrane feed pump, purchase of a spare on-the-shelf degasifier blower, and addition of piping to bypass the LPRO clearwell.

Figure 8: Rehabilitation of Media Filters

In the second expansion phase, the two (2) original 2.0 mgd membrane trains were retrofitted with additional membrane vessels and elements to increase their capacity to 2.25 mgd each. A third, larger, 3.25 mgd membrane train was installed in an open slot space which was originally planned for a 2.0 mgd train. The vessel expansion and additional third train increased the total permeate production to 7.75. With a permeate to raw water blend ratio of 3:1, the RO WTP can blend up to 2.58 mgd of raw water to produce a total of 10.33 mgd of finished water. The second expansion phase also included the installation of a fourth cartridge filter, a second degasifier tower and blower, a third clearwell transfer pump, and the addition of the two (2) Floridan Aquifer wells previously mentioned.

FPUA continues to make improvements to the LPRO plant. To improve chemical safety, FPUA has recently improved the sulfuric acid and sodium hydroxide storage and feed facilities. In the near future, FPUA plans to add a second deep injection well to provide built in redundancy for concentrate disposal.

Common Facilities

FPUA has also provided improvements to facilities common to both the LS and LPRO plants. Chlorine gas was replaced with liquid sodium hypochlorite to improve safety for the surrounding community and staff. The anhydrous ammonia and fluoride storage and feed systems were recently replaced. Of the four original high service pumps (HSPs), three have been replaced including a diesel/electric pump (HSP-1). The fourth remaining HSP will be replaced shortly. The ground storage tanks have been cleaned and painted and modifications have been made to large in-plant piping to allow the high service pumps to operate more efficiently.

Continuous Improvement

The FPUA continues to strive to better serve the more than 21,100 customers that rely on them to provide safe, efficient and cost-effective water service. Their forward-thinking approach over the past 17 years has resulted in a much-improved treatment system that is reliable and safe. They continue to execute infrastructure and capacity improvements with this goal in mind.

Figure 9: Addition of Second Degasifier Tower

Figure 10: High Service Pump Room with Diesel/Electric Pump (HSP-1)

Technical Transfer Workshop Update

Author: Karla Berroteran-Castellon, Village of Wellington/SEDA Technical Transfer Chair

On November 14th, 2019, SEDA in cooperation with the Coral Springs Improvement District and JLA Geosciences, hosted a technical transfer workshop on the topic of operation and maintenance of raw water supply wells, with an emphasis on source water quality for membrane treatment plants. Classroom and hands on teaching were provided by Caroline Faulkner Smith and Jim Andersen, both of JLA Geosciences, Inc., a hydrogeologic consulting firm, located in Jupiter, Florida. The twenty (20) participants of the workshop listened intently as Caroline and Jim discussed well theory and design, well construction methods, well development and rehabilitation techniques, and testing approaches for determining the health of water supply wells for membrane treatment plants. The class was divided into smaller groups for a hands-on learning experience. During the hands-on training Caroline, demonstrated how to properly set-up a silt density index (SDI) testing manifold and a Rossum Sand tester on a well head that was located at the water plant site, and showed students how to properly use the testing equipment. She also discussed and demonstrated the proper use of other equipment useful for gathering water quality and well performance data from the well to evaluate well health. After Caroline's demonstrations each participant was given the opportunity to collect and record SDI, sand, and other water quality data from the well using the equipment which they had just learned about. After the students returned to the classroom with the data they had collected from the well, Jim and Caroline explained how to evaluate well performance using the data. Evaluation of the data triggered additional teaching on trouble shooting well water quality issues, the importance of routine well performance and water quality data measurement, and most importantly, routinely reviewing and evaluating the data collected. Data collection without review and evaluation will not improve well health and will lead to bigger problems in time! Jim made note of some of the values in the data that should trigger well rehabilitation action. Well rehabilitation is essential for a well achieving and in many cases exceeding its expected useful life. In closing Jim and Caroline shared with the participants some of their experiences over the years with well performance issues at various water plants and how well rehabilitation efforts have been successful in recovering well performance and improving water quality. Early detection of well performance and water quality problems by routine monitoring, testing, and data evaluation enables well rehabilitation to be an option, avoiding complete well failure and the costly alternative of well replacement. Before the day was over, Joe Stephens, the Chief Operator of the Coral Springs Improvement District conducted a walking tour of their membrane sottening water treatment plant. A big thank you goes out to the Coral Springs Improvement District for providing the facilities to make the event possible, and for JLA Geosciences, Inc. and Florida Design Drilling for sponsoring the event, which included lunch.

Member Spotlight

Karla Berroteran

1. **How long have you been a member of SEDA?**
I have been a member of SEDA since 2007.

2. **Why did you join SEDA?**
I wanted to learn more about membranes and network with other plant operators. Now I serve on the SEDA Board of Directors as the current Secretary and Technology Transfer Committee Chair. I am honored to serve the SEDA membership in these roles. I am using what I have learned through SEDA to teach others and that is exciting for me!

3. **What is something that you have gained/or hope to gain by being a member of SEDA?**
I have learned pretty much everything I know about membranes by attending the MOC classes and workshops. I remember installing the first membranes with Kirk Lai at Wellington and spending numerous hours cleaning them and collecting data. I have also learned to troubleshoot problems on the membranes, how to clean them, and to comprehend normalization data.

4. **How did you get involved in the Water and Wastewater Industry?**
I am originally from Nicaragua; back in my country, I worked for a public water company (ENACAL) where I was in charge of inspecting and testing water quality parameters on small sewage plants and potable water plants in the country: I also have a degree in Chemical Engineering with a minor in Environment. When I moved to Florida, I applied for the operator apprentice position at Wellington, and I consider myself very lucky to get the job as I was learning English as my second language during that time. Fortunately for me, math and water chemistry are the same in any language. The water plant in Wellington was my first job since I moved to the United States, and it has been my best schooling. I started as an operator apprentice in 2006 and then was promoted to water plant supervisor in 2013. I enjoy working with my colleagues and I am very fortunate to have had wonderful people who have supported me and have guided me all the way through. I love my job, and I love providing safe drinking water to our Village of Wellington Service Area, to continue learning and solving the challenges that our water supply brings, and I love conveying awareness about water conservation to the public in general.

5. **What is the most recent book you have read or concert you have been to?**
I just finished reading "Troubled Water: What's Wrong with What We Drink" by Seth M. Siegel, and "The Alchemist" by Paulo Coelho. I do not go to concerts, although I love music. I enjoy travelling and going to ancient temples and old cities. Ancient architecture captivates me. My most recent trip was to Japan, and I am planning to visit Thailand soon.

6. **What activities do you enjoy in your free time?**
I enjoy very much doing Yoga and Pilates, walking and bicycling, and relaxing at the beach reading a good book.

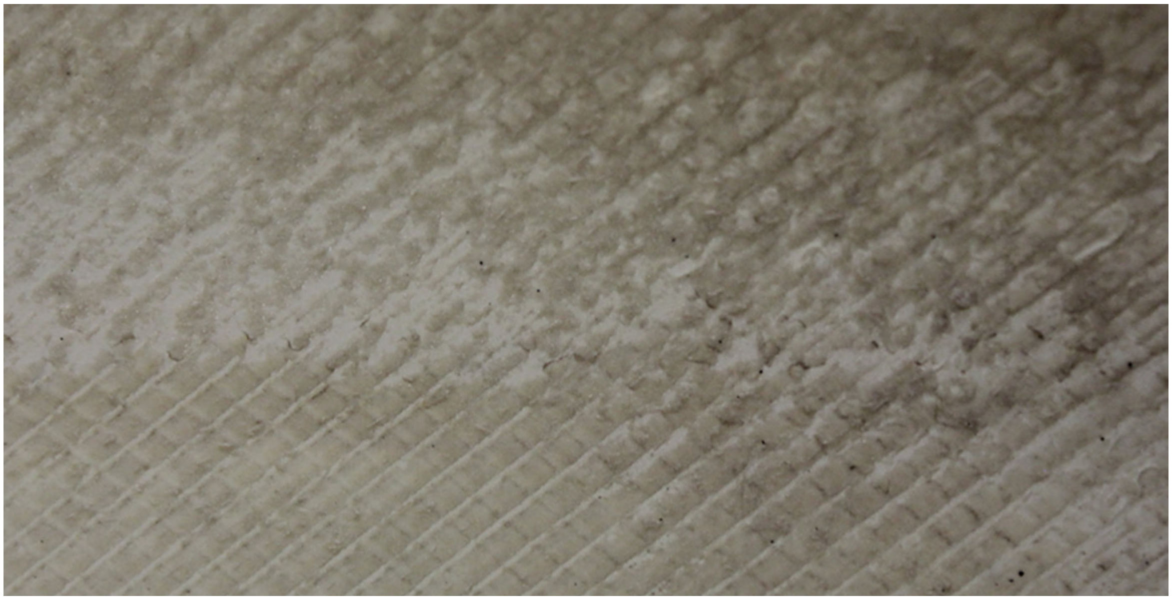
Reverse Osmosis (RO) Antiscalants

Author: Mo Malki, American Water Chemicals, Inc.

In a reverse osmosis membrane system, water is purified by forcing it through a semi-permeable membrane. A semi-permeable membrane allows gases and water to pass freely but rejects dissolved matter. In a normal, dead-end filtration process, the filtered material builds up on the filter surface, and the filter is plugged and has to be backwashed on a regular basis. If reverse osmosis were allowed to operate in this manner, the rejected salts would instantly blind off all flow through the membrane, bringing the purification process to a halt. To avoid this, reverse osmosis operates in cross-flow mode. This means that only a portion of the feed flow that enters the system is purified, leaving the rest to carry the dissolved salts away to waste. The waste stream is known as the brine or reject. The ratio of water that is purified relative to the water that enters the system is known as the recovery ratio or % recovery.

Mineral scale is formed when the dissolved salts in the brine water stream are allowed to concentrate beyond their maximum solubility. The buildup of these scales would block off the membrane and prevent purification. It is therefore essential to inhibit scale formation in RO systems so that they may operate continuously. Very small RO systems typically use water softeners to remove hardness and other cations (positively charged ions) from the feedwater. By removing cations like calcium, they can no longer combine with anions (negatively charged ions) like carbonate, phosphate, sulfate, etc. to form scales. The drawback is that softeners need to be regenerated with concentrate solutions of sodium chloride, and there are often local wastewater system restrictions on disposal of these strong brine solutions. Furthermore, softeners are not financially feasible in larger RO systems because of the capital cost and cost of regeneration.

For this reason, antiscalants are used in most RO systems, sometimes along with pH adjustment of the feed water.

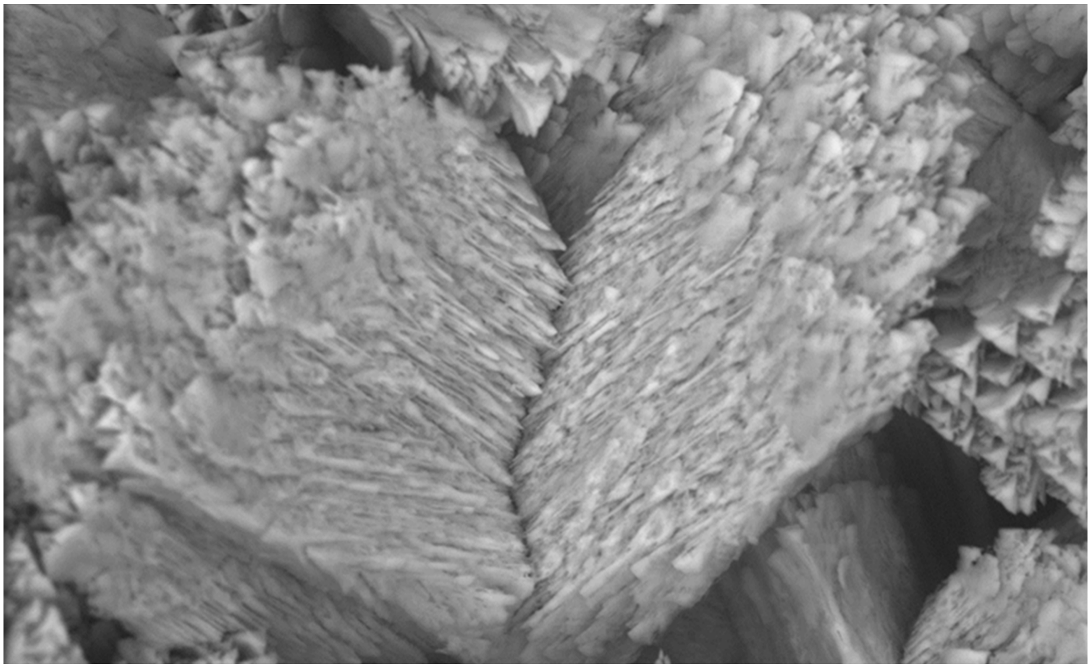


Membrane scaling

What is RO Antiscalant and how does it work?

RO antiscalants are specialty chemicals that are added upstream of a reverse osmosis (RO) membrane system. These RO chemicals are designed to inhibit (delay) mineral scale formation on the membrane surface.

In water, dissolved ions will continuously collide into each other forming small "seed" crystals in the water. When salts are below their saturation limit, this may happen very rarely, and the formed seeds quickly re-dissolve. At higher recovery, a higher ratio of the feed water is purified. Because the volume of feed water decreases while still holding the same amount of salt, the dissolved ion concentration increases (much like when water evaporates). If the solubility limit is exceeded, "seed" crystals can grow past a critical size where they become stable and no longer re-dissolve. All scaling initiates with the formation of these seed crystals, be that on a surface or in solution.



Scanning Electron Micrograph of Calcium Carbonate scale

RO antiscalants are all anionic (negatively charged), and are attracted to cations (positively charged ions) such as calcium, magnesium, iron and aluminum. They inhibit scale formation in several different ways.

An antiscalant has the capability to sequester (tie up) a cation like iron so that it can't form a scale with an anion like phosphate. Sequestrants work by bonding to, and wrapping around an ion so that it can't combine with an oppositely charged ion. But for an antiscalant to inhibit scaling entirely by sequestration, the amount of antiscalant needed would have to be equivalent to or greater than the amount of cations in the water.

Those who have used RO antiscalant know that an effective dosage is typically less than 5 mg/l even when constituents such as calcium are present in very high concentrations. So, a molecule of antiscalant can actually inhibit scale being formed by hundreds of molecules of calcium at a time. This is known as threshold inhibition.

Because RO antiscalants carry strong negative charges, they are strongly attracted to cations such as calcium within the crystal seeds. The antiscalant can adsorb (attach) to the growing seed, and interfere with the formation of the crystal. If the crystal never reaches its critical size, it dissolves back into the individual salt ions. When the seed dissolves, the RO antiscalants also dissolve back into solution and become available to interfere with the growth of other forming crystals. The more crystal seeds form, the more antiscalant is required to prevent their growth. RO Antiscalant dosage therefore depends strongly on the number of seeds or nuclei forming at the same time.

Sometimes, the scales are still able to form despite the reverse osmosis antiscalant's interference. Such scales have distorted crystal structures, and they tend to be softer and easier to flush off the RO membrane surface. They are also easier to dissolve during RO membrane cleaning.

Most antiscalants also have dispersion (anti-agglomeration) properties, although some are stronger dispersants than others. The RO antiscalant can delay fouling by preventing colloidal particles and crystal seeds from agglomerating as they concentrate due to higher recovery. However, plant operators should be aware that this is not a replacement for good pretreatment; the Silt Density Index (SDI) of the water entering the RO membranes should always be less than 5.

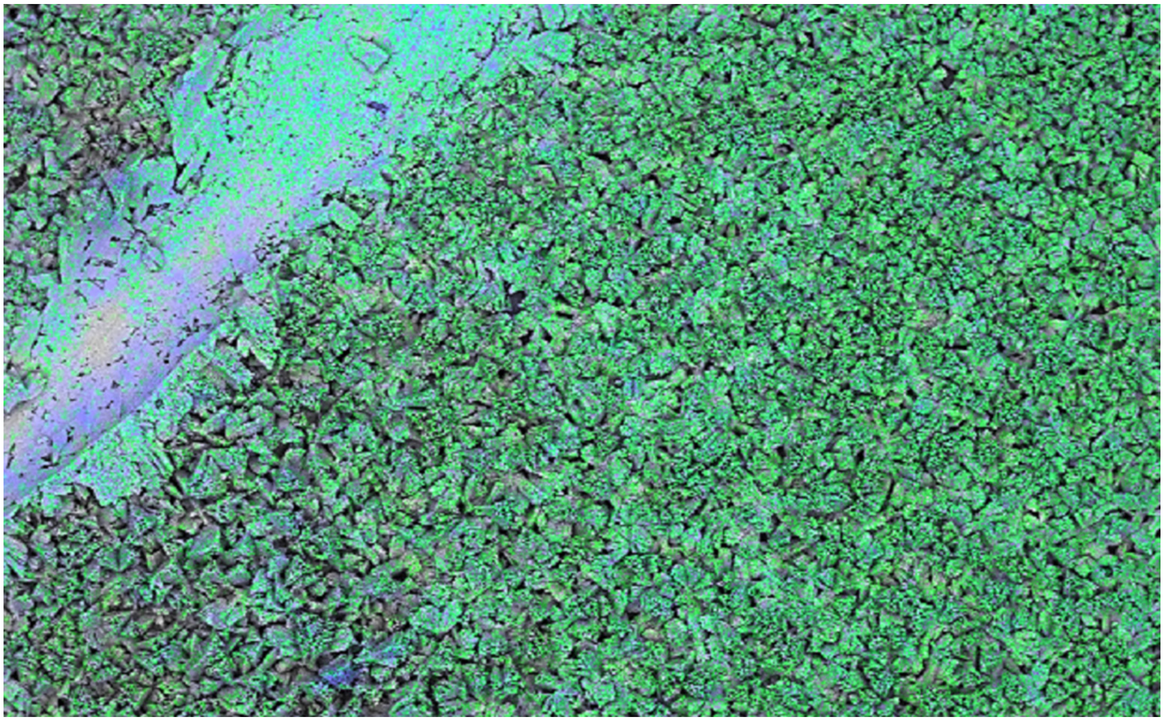
Through the mechanisms of threshold inhibition, crystal distortion, sequestration and dispersion, antiscalants are able to slow down the formation of supersaturated scales so that they do not form within the RO system or its concentrate disposal piping.

How does acid dosing for pH adjustment inhibit scaling?

Strong acids such as hydrochloric acid and sulfuric acid are sometimes used to lower feed water pH for scale control. The use of carbon dioxide for this purpose is also gaining popularity, but is usually limited to reducing pH to about 6. Only carbonate and phosphate scales can be controlled by pH reduction. Carbonate and phosphate ions interact with acid to convert to less negatively charged species that are not as strongly attracted to calcium. The lower the pH, the less negatively charged they become. In the case of carbonate alkalinity, about half of it converts to carbon dioxide at around pH 6. Carbon dioxide is a gas and cannot interact with calcium ions to form a scale.

Sulfate, fluoride and many hydroxide scales will still form at the lower end of the pH range that most reverse osmosis systems are operated. For example, ferric hydroxide can precipitate even at a low pH of 3. Calcium sulfate can form at any pH above 1 and calcium fluoride can form at any pH above 3 – well below the pH range that is typically maintained at RO plants that dose acid. The use of sulfuric acid adds sulfate to the water, so its use should be avoided where there is already a sulfate scaling potential.

Sometimes the scaling potential for calcium carbonate or calcium phosphate is so severe that a combination of acid and RO antiscalant are required for good scale inhibition. This typically happens at reverse osmosis plants that operate at very high recoveries.



Superimposed Elemental Imaging of calcium carbonate scale

How do I select the correct RO Antiscalant for my system?

There are many different RO antiscalant chemistries in use today. Selection of the appropriate antiscalant, and determination of the optimal dosage are critical for the consistent operation of a reverse osmosis system.

Reverse osmosis antiscalants that perform well at inhibiting certain scales may not perform as well for others. The presence of iron or aluminum can drive up the required dosage substantially or even completely deactivate some antiscalants, leaving them to gel up as a membrane foulant. It is therefore necessary to have accurate and up to date water analyses for proper RO antiscalant selection.

Phosphorous-free RO antiscalants are sometimes a requirement due to concentrate disposal restrictions; such antiscalants have performance limitations with certain scales and are generally more sensitive to poisoning by high calcium concentrations. The water treatment plant's operation staff should select a reputable RO antiscalant supplier that has the technical knowledge to work within those limitations.

Using the wrong reverse osmosis antiscalant can allow scaling and subsequent performance loss to occur quickly. On the other hand, by using the correct RO antiscalant at the correct dose rate, scaling problems can be eliminated completely. Modern scale prediction computer models can determine the severity of scaling potential and recommend the optimal antiscalant and dosage.

Reverse Osmosis antiscalants typically require very low dosage rates and can work in conjunction with other chemicals fed upstream. RO antiscalants are also generally safe to handle and will meet all of the environmental requirements for RO chemicals fed to a water treatment plant. Any RO chemical used in a potable membrane system must have NSF approval. However, if using a "loose" nanofiltration (NF) membrane or a "tight" ultrafiltration (UF) membrane, a standard RO antiscalant may pass into the RO permeate at levels above those permitted. Only RO antiscalants approved for those specific membrane types should be used.

How One Utility Prepared and Responded to the COVID-19 Pandemic

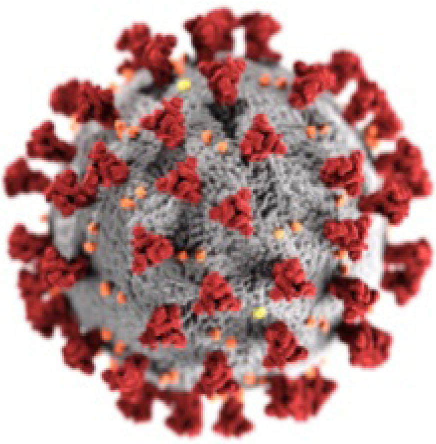
Author: Steven Montemayor, PE, Town of Jupiter Utilities

The President of the United States declared a National State of Emergency in March 2020 due to the coronavirus (COVID-19). He urged state and local governments to follow suit to implement ordinances in their jurisdictions encouraging social distancing to slow the spread of the coronavirus. Businesses and industries across the country were categorized as “essential” and “non-essential”; those deemed “non-essential” were forced to close their doors for an indeterminate length of time, and until state and local governments decide when it is safe to reopen. Those deemed “essential” have continued to work amidst the COVID-19 pandemic, taking measures to encourage social distancing and protect workers, while still getting their jobs done. Water and wastewater utilities, are obviously an essential service, though often overlooked when water is flowing, and toilets are flushing. The requirements to provide safe, reliable drinking water and sanitary waste disposal to the public remains unchanged regardless of pandemic, hurricane, other natural disaster. Utility plant operators, maintenance staff, engineers and administrators must be prepared to respond to any crisis. SEDA member utilities are accustomed to preparing for and responding to hurricanes and now COVID-19 has allowed us to experience the importance of being prepared and responding to a virus pandemic. This article summarizes some of the things the Town of Jupiter has done to prepare and respond to the coronavirus.

At the onset of COVID-19 entering the United States and the likelihood of its rapid spread across our nation, our utility director pulled out and updated the written Pandemic Influenza Plan we had created in 2009 for the Avian Flu (H5N1). The now updated COVID-19 Pandemic Plan includes a summary of preparedness and response planning objectives for our Utility to ensure timely and effective response to this current and future pandemic flu events. Our Pandemic Plan includes objectives for infection control measures; mitigation measures associated with a potential 40% reduction in workforce; possible chemical, equipment and parts supply shortages; best management practices to conserve chemical use if supply becomes short; best management practices for rationing water production and distribution if chemical supply shortage becomes imminent; and a response system for implementing pandemic response actions. Implementation of specific response actions in the plan is associated with the occurrence of specified trigger points or events.

The Town of Jupiter has a mid-sized water production facility (30 MGD) that is 93% membrane and 7% ion exchange treatment; it serves the Town of Jupiter and unincorporated surrounding areas of both Palm Beach and Martin counties. Jupiter Utilities consists of five divisions: Administration, Customer Service, Stormwater Management, Utility Field and Water Plant Operations.

The first steps of preparation for COVID-19 by our utility included inventorying and procuring extra supplies and chemicals necessary to produce water; perform maintenance repairs at the plant and in the distribution system; and confirm there would be sufficient personal protective equipment and sheltering supplies (should sheltering at the water plant be required). Measures to promote social distancing within and external to our operations to protect our greatest assets (our workforce) were implemented. Some changes to our operations included dividing our workforce into teams with rotating work schedules to avoid having all personnel at work and exposed to each other at the same time. Additionally, we limited access to the water plant control room to essential personnel that perform work in and from the control room. We have limited access to the water plant site to only visitors necessary for providing essential services and making deliveries. Employees not physically reporting to work are expected to work from home when possible and where practical. These social distancing measures are serving to safe guard and protect



our essential staff, suppliers and vendors as they conduct their business to maintain water production and distribution systems services. On the customer service end, we have reduced interaction with the public; closing customer service counters and the Jupiter Town Hall to the public and placing more of an emphasis on online services for utility payments, service calls, permitting and customer inquiries. Throughout the Town's business departments, social distancing, frequent cleaning of surfaces, routine hand washing, and hand sanitizer use have been implemented in all office work spaces. Employees are requested to ride alone in Town vehicles and staff minimized the number of trips out in the field. Courtesy inspections and testing of water at customer's residences are suspended. Water field crews are reporting to emergency calls for items such as main breaks, meter leaks, and customer complaints of low pressure or no water. System maintenance tasks that can be accomplished within the recommendations for social distancing are being performed where possible. Water shut offs for non-payment have been postponed until further notice. In instances where field staff must interact with the public, staff is encouraged to maintain safe social distances and wear face coverings.

As we were busy responding to address COVID-19, the Town's computer systems were unexpectedly hit by a cyberattack which took the Town's computer network, telephone lines, e-mail, online services, and other peripherals out of service for several weeks. Thankfully, the water treatment plant, distribution system process control systems and servers are isolated and were not infected by the cyberattack. Immediate action was taken by the Town's Information Systems department to stop the virus, identify damage caused by the virus, restore computer and phone systems, and implement more stringent security features to protect against potential future attacks. This cyber-virus affected our ability to conduct business more than COVID-19 has, and thankfully water production and water service were not interrupted by the cyberattack, but it has been a wakeup call to prepare and implement plans for protecting against the potential threat of future cyberattacks.

Construction of capital improvement projects has continued during the pandemic. Inspectors are wearing face coverings and maintaining safe social distances from others. Meetings are being held by teleconference, video conference, and when necessary in the field with safe social distancing and face coverings.

With a pandemic plan in place before a threat occurs and before situations become stressful, it is easier for personnel to prepare and respond. Staff should be given the opportunity to get familiarized with the written plan before the crisis hits so that when the crisis hits, they know what is expected of them and how to respond. The purpose of the plan should be to protect the wellbeing of your greatest resource, your workforce, so that they are available to conduct their critically important jobs of producing safe and reliable drinking water and/or providing safe and reliable wastewater treatment. We do look forward to returning to a "new normal" way of life soon, as I am sure you are too! Stay safe and healthy.

The 2020 Annual SEDA Election

Ballots will be emailed on April 25, 2020

Voting will end May 15, 2020

Your Vote Counts!

VOTE

Membrane Operators Certification (MOC) Update

Author: Chris Ballard, PE, Toray Membrane USA; MOC Committee Chair

The SEDA Membrane Operator Certification (MOC) Course Module I, Introduction to Membrane Systems, was presented September 16-18th, 2019, in Jacksonville, North Carolina and hosted by the Onslow Water and Sewer Authority (ONWASA). David Briley from Hazen and Sawyer joined Josh Utter from American Water Chemicals, Nick Black from Kimley-Horn & Associates, Jason Bailey from Avista Technologies, and Samantha Black from HDR, Inc. provided informative and inspiring instruction for the 2 ½ day course. Topics included an introduction to membrane processes, water supplies for membrane systems, water chemistry, chemical pretreatment, membrane system post treatment, and the mechanical components of membrane systems. Jim McDonnel from ONWASA conducted a walking tour of the Dixon Water Treatment Plant that gave the class of fifteen operators an opportunity to ask additional questions to supplement the classroom instruction. On the final day of the course, students reviewed the course materials that had been taught the previous two days before taking the course exam. Sponsors of the course included American Water Chemicals, Toray Membrane USA, and Avista Technologies.

A second MOC Module 1 course, Introduction to Membrane Systems was offered on October 29-31st, 2019, at the Pinellas County Solid Waste Management Facility in St. Petersburg, Florida. This event attracted twenty three operators. Distinguished instructors included Robert Reiss from Reiss Engineering, Andrea Netcher from Tetra Tech, Lance Littrell from Kimley-Horn & Associates, Kirk Martin from Water Science Associates, James Anderson from Classic Controls, and Mo Malki from American Water Chemicals. Pinellas County graciously provided the facility for the classroom sessions. An impressive tour of Pinellas County's Industrial Water Treatment Facility was led by Pinellas County staff under the leadership of Mario Rugghia. Sponsors of the course were American Water Chemicals, Toray Membrane USA, and Avista Technologies.

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.

Pinellas City Host Plant staff

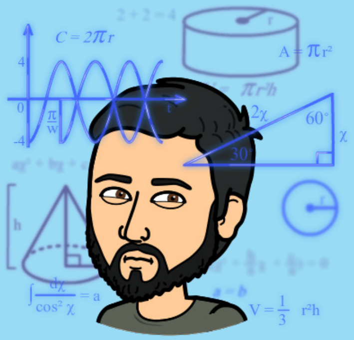
NC Dixon RO skids

NC Dixon plant front

The Traveling Troubleshooter: Data Part #2

Author: Anonymous

Data collection…the displayed choices ….



So many questions;
Does zero = 0 = 0.1 = 0.09…same, same? Should I round up the number and to what decimal place? How do I record a constantly moving number? No worries we'll get there…

"So, let's have a look at what data is available and how it's displayed.", Stubbs said. Operators Bettie Presterpin and Bobby Tippings followed along as Stubbs ran through the process and pointed out each component and display from which the data would be recorded.

Starting with a pressure gauge on a panel with a cluster of other instruments, he went through the options for recording pressures.

The analog gauge uses a mechanical pointer and a calculated scale. One gauge can also indicate several pressures with the use of a multi-position valve. The indicating transmitter that can be blind, have a local digital display or a combination display with a digital and analog representation. Both Analog and Digital pressure indicators may be mounted directly at the process connection, remotely in another area, remotely grouped together at the Train Status Panel or a combination of these. They are connected by tubing and or by an electrical signal.

Control Room Monitoring Data

Panel meters can be used to display the value of a remote or blind transmitter and may also display a calculated value such as differential pressure. When present a local control panel will display a digital representation of the transmitted signals and finally, the Control Room SCADA System, will also display and record transmitted signals.

"The pressures required to be recorded on the Train data sheet may not all be in one location, area or room. SCADA will probably not be connected to most local analog gauges and some local transmitters. You may also be required to record multiple entries for the same pressure such as Feed pressure. It can be recorded at the gauge, at the transmitter, at the local control panel, and from SCADA." Stubbs paused to let Bettie and Bobbie ask, "Why?"

To be continued...

In Memoriam: Charles McAllister

Charles J. McAllister (1946-2020)

Charlie McAllister, a 25-year veteran of the desalination and water treatment industry, died on 15 January 2020, in Sarasota, Florida. He was 73.

Charlie was born in Newark, New Jersey, on 15 August 1946, and graduated from St Joseph's University in 1968 with degrees in chemistry and biology. Following college, he served as a 1st Lieutenant in the US Army and was stationed with NATO troops across Europe.

Most of Charlie's career was spent in the membrane water treatment industry, and he began his career with Crane, where he was involved in the design, installation and operation of desalination, drinking and process water systems around the world. He was also active in the Caribbean Desalination Association and the Florida Rural Water Association, and in 2016, he received a distinguished service award for his work with the Southeast Desalting Association.

Charlie thoroughly enjoyed life. His friends remember him as a true salesman who always had a story to share and who always had extra energy in his voice when he spoke of his grandchildren.

He was interred with military honors at the Sarasota National Cemetery on Friday, 6 March.

His wife Kathleen, two children and two grandchildren survive him.

Legislative Update

Authors: Pierre Vignier, City of Port St. Lucie and David McNevin, PhD, PE, CDM Smith ;SEDA Legislative Committee

The USEPA recently proposed new revisions to the Lead and Copper Rule (LCR) that would constitute the first major update of the LCR since 1991. The proposal focuses on six key areas:

1) require utilities to identify most impacted areas for lead service lines;
2) strengthen treatment requirements for lead with a new trigger level at 10 parts per billion (ppb);
3) increase replacement of lead service lines, requiring utilities to replace lines when a homeowner chooses to replace his portion of the line;
4) require utilities to follow new sampling procedures for lead;
5) require faster notification of homeowners when lead results exceed the 15 ppb action level; and finally
6) require water systems to take drinking water samples from schools and child care facilities served by the system.

The proposed LCR maintains the current Maximum Contaminant Level Goal (MCLG) of "zero" and the Action Level of 15 ppb. The proposed rule will require a more comprehensive response at the action level, and introduces a trigger level of 10 ppb that requires more proactive planning in communities with lead service lines.

USEPA encourages municipalities to leverage federal resources to support local lead service line replacement projects including Drinking Water State Revolving Loan Funds, EPA's Water Infrastructure Improvements for the Nation Act grant programs, EPA's Water Infrastructure Finance and Innovation Act financing program, and HUD Community Development Block Grants.

More information is available at:
www.epa.gov/safewater/pipereplacement
www.epa.gov/sites/production/files/2019-10/documents/proposed_lead_and_copper_rule_infographic.pdf

SEDA QUIZ

By: Brian Matthews, City of Palm Coast, Environmental Compliance Manager

1. Which of the following is also known as the "Forever Chemical" group of compounds?
   A. PFAS
   B. PFAR
   C. FASC
   D. FCCA
2. What does the "Forever Chemical" group of compounds acronym stand for?
   A. Per and Poly Fluoroalkyl Substances
   B. Per and Poly Fluoroalkyl Regulations
   C. Forever Alkyl Super Compounds
   D. Forever Chemical Compound Association
3. Where can these compounds typically be found?
   A. Paints, Cosmetics and Shampoo
   B. Non-Stick Cookware, Food Packaging and your blood
   C. Pesticides, Fire Fighting Foam and Stain Resistant Coatings
   D. All the above
4. What is the current treatment technology for removing these compounds from drinking water?
   A. Activated Carbon Reactors
   B. Ion Exchange
   C. Membrane Filtration
   D. All of the above
5. Why are these compounds important to us?
   A. They cause a strange taste to the water
   B. They cause the water to be very slippery
   C. They are suspected of having negative health effects
   D. They cause severe health effects in humans that have been determined after many years of research
6. How long have these compounds been in existence?
   A. 2 years
   B. 20 years
   C. 40 years
   D. 70 years
7. What are the suspected health effects from these compounds?
   A. None known
   B. Reproductive, Immunological, Cancer, Thyroid hormone disruption and others
   C. Birth defects such as too many toes or fingers, different color eyes and others
   D. Early onset dementia and alzheimer's disease
8. Who is affected by these compounds?
   A. Insects
   B. Humans
   C. Birds and Fish
   D. All the above
9. What is being done to address these contaminants?
   A. Local governments are preparing by updating their capital improvement plans
   B. The EPA has established a National Action Plan describing required steps
   C. Utility systems are not concerned
   D. A and B
10. What is the expected MCL for this compound when it is regulated by the EPA?
   A. 70 mg/l
   B. 70 µ/l
   C. 70 ng/l
   D. 0.1 mg/l

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

Welcome to Our New Members

GABRIEL ANDERSON
DARE COUNTY WATER DEPARTMENT

JEROME ALLEN
GREATER PINE ISLAND WATER ASSOCIATION

KEITH BELLISSIMO
STUDENT

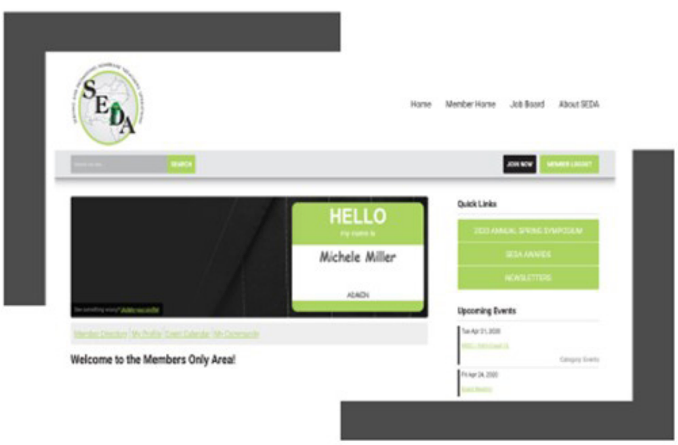
TARYN DOYLE
PROTEC-ARISAWA

JAMES GOULD
DARE COUNTY WATER DEPARTMENT

MARCOS MARRERO-TAMAYO
PALM BEACH COUNTY WATER UTILITIES

SARA OULY
TOWN OF JUPITER

SEDA.Memberclicks.net
What Can I Do Here?



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- Access the Member Directory
- View the Event Calendar
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