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50th Anniversary
AQUA-AEROBIC SYSTEMS, INC.
 A Metawater Company

1969 – 2019

OPERATION UPDATE

A Newsletter for Aqua-Aerobic Plant Operators

THE DO'S AND DON'TS OF OPERATING AN AQUASBR®

In this edition of the Operation Update Newsletter, we'd like to discuss the general Do's and Don'ts of operating an AquaSBR® Sequencing Batch Reactor. The examples below are common issues that operators run into, and are a guide to help you prevent future issues and/or potentially correct any current issues you may be experiencing. As always, we encourage you to give us a call to discuss your concerns if they are not listed below.



AquaSBR® Sequencing Batch Reactor Installation - Buxahatchee, AL

DO know where your plant's Process Design and Control Strategy are located in the O&M Manual.

These are typically located in Section 3 of your AquaSBR O&M Manual. The answers to most of your process related questions can be found in this section of the O&M Manual.

DO know your effluent objectives.

It is quite difficult to captain a ship to a destination when you don't know the destination. Your effluent objectives *are* the destination. If you are not sure how to get there under certain circumstances, give our customer service department a call to speak with a process specialist.

DO confirm your basin level settings are set at design values.

Operating with different settings can reduce hydraulic and organic load capacity, and can adversely affect your equipment or effluent.

DO know that "LWL" in LWL MLSS stands for "Low Water Level" and that this is the same level as the "End Decant" level setpoint. If you collect a MLSS sample from a basin that is not at the LWL, convert it to the LWL equivalent using the LWL equation in our Process Manual.

DO try to avoid operating with a long Settle phase duration.

We would recommend trying to keep the Settle phase duration at less than 90 minutes. A typical Settle time is in the range of 45-60 minutes. If you need to have the Settle phase duration longer than this, then you probably have a significant settling issue that would need to be corrected with another approach.

DO avoid having a long Mix Fill phase, especially if you're struggling with high effluent ammonia.

A typical Mix Fill time is in the range of 30-60 minutes. A long Mix Fill phase reduces aeration because it takes time from the React Fill phase. The Mix Fill phase does have the potential to reduce certain types of filaments by producing an anaerobic environment. However, too long of an anaerobic period—and, in some cases, an anaerobic period in general—has the potential to cause certain other types of filaments to proliferate, and also has the potential to negatively affect the nitrifying bacteria population.

DO use the SVI calculation and the basin sludge blanket level at the end of the Settle phase to determine how well your MLSS is settling.

The settleometer reading (Sv30) is only part of the story, and doesn't always represent what is happening in the actual basin.

DON'T target a LWL MLSS concentration less than 1,000-1,200 mg/L.

Concentrations below this range will typically result in a turbid supernatant with elevated effluent BOD and TSS.



THE DO'S AND DON'T OF AQUASBR® OPERATION *continued from page 1*

DO monitor the influent TKN or NH₃-N concentration regularly if you have any form of nitrogen as an effluent permit requirement.

This will help you set the target LWL MLSS concentration based upon the influent nitrogen load to the plant.

DO base your target LWL MLSS concentration upon the influent loading percentage relative to the plant design.

Once a target has been determined, increase or decrease wasting as needed to maintain that target.

DON'T let your decanter, mixer, or SBR become a hydroponic botanical garden.

Good housekeeping will help preserve the lifespan of your equipment, and makes a good impression on plant visitors. Just because it is camouflaged does not mean people won't notice it.



"Don't let your decanter, mixer, or SBR become a hydroponic botanical garden."

DO contact us if you are experiencing settling issues.

Many times, the solution to settling issues is to target the correct LWL MLSS concentration, but not always. Let us help you find the solution if you're not sure what it might be.

DO know your design and current F/M ratio.

Operating with a severely low F/M ratio (< 0.04) has been known to cause filamentous proliferations and subsequent settling issues.

DO use liquid sodium hypochlorite when chlorinating the MLSS for a filament proliferation.

In our experience, calcium hypochlorite (powdered chlorine, chlorine tablets, or HTH) typically cause some adverse effects, so liquid sodium hypochlorite is preferred.

DO check your LWL MLSS concentration and run a settleometer test at least once per week.

DO know the preventative maintenance schedule for your equipment.

This information is typically in the O&M Manual under that particular equipment's section.

DON'T use a non LWL MLSS, the settleometer reading, or a centrifuge to determine if wasting should be increased or decreased.

DO use a Sludge Judge, or other blanket measuring device, to determine the sludge blanket level (or feet of clear supernatant) at the end of the Settle phase.

Knowing the blanket level on a day-to-day basis will help determine if the settle duration is adequate or if a change in settleability is occurring.

DO base SRT values off of moving averages.

Without moving averages, the SRT calculation is quite volatile—producing large differences between day-to-day values. We recommend implementing a 5 to 10-day moving average for the LWL MLSS and WAS concentrations to reduce this variability.

DON'T adjust your phase time durations without considering how that adjustment might affect aeration.

Even a simple Settle Phase adjustment will also adjust the React Phase, which adjusts the total potential aeration time.

DO avoid letting your SBR system automatically go into one of the Storm Modes under normal dry weather conditions.

Make sure that your SBR is set up to run an adequate number of cycles to avoid going into Storm Mode during dry weather operation.

DO operate with the design Decant phase duration.

The design Decant phase duration can be found in the Control Strategy. Operating with a shorter Decant phase duration than the design could cause the system to go into one of the Storm Modes more easily, and would make it more difficult for the system to get out of Storm Mode if it were initiated. This is because shortening the Decant phase duration can actually reduce the hydraulic capacity of the plant, since the SBR will not be able to decant a full batch.

DON'T let your MLSS go unaerated for longer than 4 hours, especially if you have nitrogen in your effluent permit.

Nitrifiers are obligate aerobes (don't do well in anaerobic environments) and will struggle to survive after going approximately 4 hours without dissolved oxygen.

THE DO'S AND DON'T OF AQUASBR® OPERATION *continued from page 2*

DON'T allow your basin and/or equipment to freeze.



Allowing your equipment to become entombed in ice will likely ruin it (R.I.P.).

DO check your digester pH, and run a D.O. profile to confirm it is being properly aerated.

We recommend keeping the D.O. above 1.0 mg/L and below 4.0 mg/L during aeration “ON” times in the digester. Ammonia is released during digestion, and over-aeration of a digester containing high amounts of ammonia will produce high levels of nitrate as well as a decline in alkalinity. When the alkalinity gets close to being depleted, the pH will drop too, which could cause the digestion process to become upset and produce foam. We recommend keeping the pH above 6.5 at all times. Adding some aeration “OFF” time will not only reduce the alkalinity depletion, but will also regain about half of the alkalinity lost. In some extreme cases, you may need to add some supplemental alkalinity (soda ash, sodium hydroxide, etc.). We recommend limiting aeration “OFF” times to 60 minutes or less. In addition, low D.O. in a digester has the tendency to turn your digester into a filament production farm, which typically seeds the SBR with filaments during dewatering and results with poor settling of the MLSS. Poor digester operation can often be the source of many adverse symptoms observed in the SBR.

DON'T let your SBR or digester basin pH drop below 6.5 SU.

If possible, target a pH of 7.0 to 7.5 and make it a goal to never let the pH drop below 7.0 SU. Both nitrification and good floc formation are dependent upon keeping the pH relatively neutral. If you're having trouble maintaining your basin pH, you may need to consider adding supplemental alkalinity to each basin, and/or implementing some aeration “OFF” time to regain alkalinity. Contact us if you're not sure if your plant could withstand a reduction in aeration time for this purpose, as there are many factors that will determine if it is possible to implement without causing other issues.

DON'T decant a whole digester all at once, especially if you have a low effluent nitrogen and/or phosphorus limit.

Doing this can send a large slug-load of ammonia and/or phosphorus back through the plant that could cause an effluent permit violation.

DO know that buttons with the words “Adjust 1 SBR” or “Adjust 1 Basin” are for adjusting the phase times for the appropriate number of basins that are in operation.

For example, a button labeled “Adjust 2 SBR” is for adjusting the phase times for 2-Basin mode. Similarly, a button labeled “Adjust 4 Basin” is for adjusting the phase times for 4-Basin mode. Phase times are universal for the number of basins online. There are not individual phase times for each basin.



The above screenshot displays a typical AquaSBR HMI.

DO consider running something other than a whole number of cycles per day.

This will serve to balance the influent load between the SBR basins.

DO contact Aqua-Aerobic Systems, Inc. with any questions.

Owning our equipment entitles you to 24/7 mechanical, electrical, and process support via telephone from an actual person in our Customer Service department for the life-time of your equipment.

DON'T let free support go to waste!

Our customer service representatives have assisted numerous plant managers and operators who wished they had reached out sooner. Call our 24/7 Customer Support line at (800) 940-5008, email CustomerService@Aqua-Aerobic.com for mechanical or electrical issues, or ProcessSupport@Aqua-Aerobic.com for process issues.



THE DO'S AND DON'TS OF OPERATING A CLOTH MEDIA FILTER

Aqua-Aerobic Systems has been providing cloth media filters for over 25 years. During that time, we have learned a few things about the operation of cloth media filters. We wanted to pass some of that information along to our customer base. Presented below are some "Do's and Don'ts" for operating your filter.

DON'T add calcium hypochlorite (HTH) to your cloth media filter.

Calcium hypochlorite comes in a solid form as either powder or pellets. When calcium hypochlorite is added to wastewater that has sulfates in it, it creates calcium sulfate, which is basically Plaster of Paris. The calcium sulfate has a tendency to plate out on the cloth and harden. This in turn plugs up the cloth, reduces the filter's hydraulic capacity, and adds weight to the center tube.

DO make sure that your cloth media is properly installed, with the Velcro strip securely fastened below the retainer bars.



Installing a cloth segment above the retainer bar could result in a breach in the filter medium, allowing unfiltered water into the effluent

DON'T feed chlorine to a filter with nylon (PA2-13) cloth installed.

We do provide chlorine resistant cloth to some of our installations. PES-13 (blue and white) cloth is chlorine resistant, as is PES-14 (all blue). However our PA2-13 (all white) cloth is not chlorine resistant and the cloth would be damaged by free chlorine. If our PA2-13 cloth needs to be cleaned, the cleaning procedure includes the use of liquid ammonia with liquid sodium hypochlorite, but not just liquid sodium hypochlorite.

DON'T allow the backwash valves on the filter to be submerged.

The backwash valves and actuators on your cloth filter are not submersible. If they are submerged, then it is likely that damage will occur to the actuators, and they will need to be replaced.

DON'T overdose polymer upstream of the filter.

If polymer is either overdosed or not allowed to adequately react with the filter influent prior to introduction to the filter, then it can foul the cloth. Ensure that your polymer dose is minimized and the polymer has time to react prior to introduction to the filter.

DON'T run the filter with a high vacuum during backwash.

The vacuum gauge reading during a backwash cycle should be less than 20 inHg. If the backwash runs higher than 20 inHg, it is a sign that the cloth may be fouled. Running the filter with a high vacuum during backwash can lead to drive chain breaks, pump cavitation, cloth wear and loss of hydraulic capacity.



The vacuum gauge reading during a backwash cycle should be less than 20 Hg.

DO perform an inspection of the filter on a regular basis.

A daily visual inspection of the filter is recommended. This will allow the operator to confirm that the filter is operating normally. Items such as vacuum readings during backwash, frequency of backwash, and whether or not the filter is returning to its Low Water Level after backwash should be noted. Also, confirmation of whether the backwash pump is cavitating, and whether there are any active alarms can be noted.

DON'T expose the cloth filter to UV light.

The cloth media can become brittle or damaged if it is exposed to UV light. Before the cloth is installed, keep it in a box or covered with a tarp. Once the filter cloth is installed, if a filter is to be taken offline, then cover the cloth with a tarp, or keep the media submerged under water.

DON'T overtighten the hardware on your cloth disks when changing out the cloth.

We recommend that the hardware for holding the retainer bars in place is tightened to 90 in-lbs (7.5 ft-lbs) for a AquaDisk® filter and 40-50 in-lbs for an AquaDiamond® filter

THE DO'S AND DON'TS OF OPERATING A CLOTH MEDIA FILTER

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DON'T hesitate to send in a sample of your cloth if you believe it is fouled or you are trying to determine the best recipe to clean it. We can perform a microscopic and chemical analysis of your cloth to determine if it is fouled and the best recipe for cleaning it. This service is free of charge. Be sure to contact us prior to shipping your cloth so that we can coordinate the analysis of your cloth.



The above is a result of iron salts and polymer overdoses upstream of a cloth filter

DO drain each filter at least once per year to perform a visual inspection of the interior.

Items to be inspected once the filter was drained would be:

- Confirm the V-ring seal is in place and intact. If the V-ring seal is damaged or missing, then replace it immediately.
- Confirm there are no visible holes or abnormal wear patterns on the cloth
- Confirm that there are no excess solids on the floor of the tank. If there are excess solids, then use a hose to remove and increase the solids wasting frequency or duration once the filter is placed back into automatic operation.
- Confirm the rider wheels are contacting the center tube during rotation of the center tube.

DO know that we offer training on cloth media filter operation and maintenance.

Contact our Aftermarket Sales group if you would like to schedule a trip to your site to perform filter O+M training.

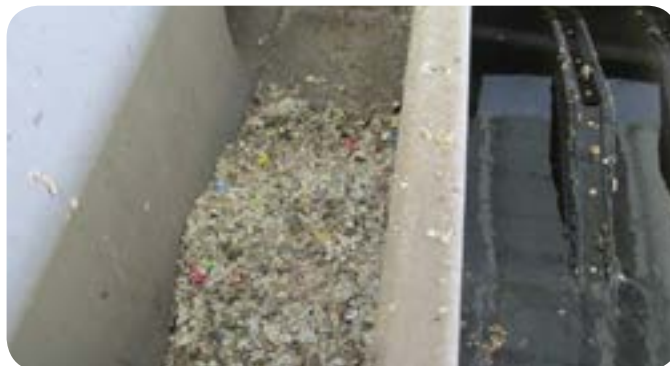
DO know that Aqua offers mechanical inspections of your filter.

If your filter is reaching a condition where it needs to be rebuilt, we can assess the filter to determine the best avenue for restoring it to proper operating condition.

DO clean your filter cloth and basin on an as-needed basis.

The need to chemically clean the cloth on a cloth media filter is an issue that varies from site to site. If you determine your filter would need to have its cloth cleaned, feel free to do so while following our recommended cleaning procedures. The need to clean your cloth is usually confirmed by noting:

- Increased backwash frequency
- Lack of hydraulic capacity
- Pump cavitation
- The filter not returning to its low water level during backwash
- Vacuum reading of > 20 inHg during backwash



Buildup of plastics and debris in the influent weir of an AquaDisk® filter.

DO call our Customer Service Line if you need assistance.

We have toll-free, 24-hour Customer Support if you need any technical assistance with your filter. Feel free to call us anytime at (800) 940-5008.

DO review the PLC and HMI that you have installed on your filter.

Note that some of the PLCs and HMIs installed on our cloth media filters are no longer commercially available as they have become obsolete by their original manufacturer. Don't leave yourself without the ability to control your filter operation. Contact our Customer Service line or Sherry Pike at (815) 639-4589 to discuss your filter controls and whether a controls upgrade to current technology is recommended.

By following this simple list of "Do's and Don'ts," you could extend the life of your cloth media filter for many years to come.



CONGRATULATIONS 2018 PLANT PERFORMANCE AWARD RECIPIENTS

CUSTOMER NAME	PRODUCT	CITY	STATE
West Montrose Sanitation District	AquaSBR System	Montrose	CO
Big Coppitt WWTP	AquaSBR System	Big Coppitt	FL
City of Deland Wiley M. Nash WRF	AquaDiamond Filter	DeLang	FL
Leesburg (City of) - Canal Street WWTP	AquaDisk Filter	Leesburg	FL
Lynn Haven WWTP	AquaSBR System & AquaDisk Filter	Lynn Haven	FL
Harlem WPCP	AquaSBR System	Harlem	GA
Spencer (Town of) WWTP	AquaSBR System	Spencer	IN
Itasca WWTP	AquaSBR System	Itasca	IL
Clear Lake Sanitary District	AquaSBR System	Clear Lake	IA
Grundy Center WWTF	AquaSBR System	Grundy Center	IA
Marshalltown Water Pollution Control Plant	AquaSBR System	Marshalltown	IA
Boonsboro WWTP	AquaSBR System & AquaDisk Filter	Boonsboro	MD
Prince Frederick WWTP	AquaSBR System	Prince Frederick	MD
Taneytown WWTP (City Of)	AquaSBR System	Taneytown	MD
Lee WWTP	AquaSBR System & AquaDisk Filter	Lee	MA
Norfolk WWTP	AquaSBR System	Norfolk	NE
Sidney WWTP	AquaSBR System	Sidney	NE
Peterborough WWTP	AquaSBR System	Peterborough	NH
Sparta WWTP	AquaSBR System	Sparta	NC
Abbottstown Paradise Joint Sewer Authority	AquaSBR System	Abbottstown	PA
Atglen Borough STP	AquaSBR System	Atglen	PA
Biglerville Borough WWTP	AquaSBR System	Biglerville	PA
Bloomfield Borough WWTP	AquaSBR System	New Bloomfield	PA
Bonneauville (Borough of) STP	AquaSBR System	Bonneauville	PA
Branch Cass Regional Sewer Authority	AquaSBR System	Llewellyn	PA
Centre Hall Potter Sewer Authority	AquaSBR System	Centre Hall	PA
Colver STP / Cambria Township Sewer Authority	AquaSBR System	Colver	PA
Conewago Township Sewer Authority WWTP	AquaSBR System	York	PA
Duncannon Borough Municipal Auth. WWTP	AquaSBR System	Duncannon	PA
Earl Township Sewer Authority	AquaSBR System	New Holland	PA
East Berlin WWTP	AquaSBR System	East Berlin	PA
East Hanover Township - Dairy Lane WWTP	AquaSBR System	Grantville	PA
Eastern York County Sewer Authority WWTP	AquaSBR System & AquaDisk Filter	Hellam	PA
Fort Indiantown Gap WWTP	AquaSBR & AquaDisk Filter	Annville	PA
Fredericksburg Water & Sewer Authority	AquaSBR System & AquaDisk Filter	Lebanon	PA

2018 PLANT PERFORMANCE AWARD RECIPIENTS

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CUSTOMER NAME	PRODUCT	CITY	STATE
Herndon WWTP	AquaSBR System	Herndon	PA
Jackson Township Authority	AquaSBR System	Myerstown	PA
Jefferson Codorus Joint Sewer Authority	AquaSBR System	Codorus	PA
Jenks Township	AquaSBR System	Marienville	PA
Jonestown WWTP	AquaSBR System	Jonestown	PA
Lower Mahanoy Township Municipal Authority	AquaSBR System	Dalmatia	PA
Millersville Borough WWTP	AquaSBR System	Millersville	PA
Monroe Valley STP	AquaSBR System	Jonestown	PA
North Codorus Township WWTP	AquaSBR System	York	PA
Northwestern Lancaster County Auth. STP	AquaSBR System	Manheim	PA
Oley Township Municipal Authority	AquaSBR System	Oley	PA
Penn Township WWTP	AquaDiamond Filter	Hanover	PA
Quarryville Borough Authority WWTP	AquaSBR System	Quarryville	PA
Revloc STP / Cambria Township Sewer Authority	AquaSBR System	Revloc	PA
Silver Spring Township Authority	AquaSBR System & AquaDisk Filter	Mechanicsburg	PA
South Coatesville STP	AquaSBR System	Coatesville	PA
Spring Grove WWTP	AquaSBR System	Spring Grove	PA
Stewartstown Borough Authority	AquaSBR System	Stewartstown	PA
Twin Boroughs STP	AquaSBR System	Mifflin	PA
West Hanover Township WWTP	AquaSBR System	West Hanover	PA
Wind Gap Municipal Authority WWTP	AquaSBR System	Wind Gap	PA
Parham Landing WWTP	AquaSBR System & AquaDisk Filter	West Point	VA
Quechee WWTF	AquaSBR System & AquaDisk Filter	Quechee	VT

SEND US YOUR DATA AND WIN CONTEST WINNERS ANNOUNCED

Since 2014, our Customer Service team has conducted an annual Treatment Plant Award Drawing as a “thank you” to those plants that send in their operating data.

Congratulations to this year’s contest winners!

Monroe Valley WWTP, PA and Big Coppitt WWTP, FL

The Contest Winners Receive:

Two free days of on-site assistance from one of our Field Service Technicians. The days on site can be used within a calendar year of the drawing and can be utilized for process or mechanical training, or equipment inspection.

We are grateful to all of our plants that have sent in their operating data over the past several years. The data is very useful to our process engineers in the event your facility contacts us with process concerns.

The data also allows us to access how your system is loaded relative to the original design and assists us in formulating our process recommendations.

If you have not yet sent us your data, please send it to ProcessData@aqua-aerobic.com. To qualify for the next drawing, we request a minimum of 6 months of data in the calendar year, with a minimum of the information below:

- Influent average and maximum flows (Required)
- Effluent data (required)
- Influent data (if available)
- Daily operating information such as MLSS, settleability, pH, etc. (if available)

Thanks to all for sending in your plant data, and please continue to do so as the drawing is an annual event.



50th Anniversary
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