

April 2018

The Wastewater Insight



Spring is just around the corner

The first Robin of the season finally just showed up. Although that may make us a bit happier, technically, it means wild weather swings for the next few weeks or months for your wastewater treatment plant. Dealing with changes in temperature at a wastewater treatment plant can be tricky. Just when you think it is going to stay warm, a colder front hits.



Snow or colder weather can still hit at any time, upsetting your plant, changing temperatures and making it harder for the bacteria to achieve BOD and TSS degradation. Even if you live in warmer climates and never get snow, there still is a difference in spring, vs summer vs winter temperatures.

Keep in mind, for every 10 degrees C change in weather, to the bacteria that can mean a logs growth in change in biological activity. That means that no matter where you are, whether a northern climate or a southern climate, a change in temperature usually means minor adjustments in the wastewater treatment process. Theoretically any time you make more than a 10% change to any process it becomes a big change to your biomass. Most plants carry a higher inventory of MLSS for the colder months then during the hot temperatures of summer.



Snow melts or heavy spring rains can also cause an overload of water to the system if you have runoff from industrial plants, CSO's or infiltration in the collection systems. This hydraulic overload can easily impact the loading to any system .

Freezing and then thawing repeatedly can put wear and tear on the system, as well as create strange ice formations.



Frozen ice towers in a digester are shown here. This was an interesting phenomena. The bubbling action of the diffusers caused small formations to slowly build up and freeze.

Safety can be impacted in winter or early spring. Stairs can freeze and thaw and make conditions slippery. Handrails & walkways can also ice up.



We started this month out with a new **Mystery Bug of the month!**

Check out our website for more photos of our new mystery bug!!!!

EnvironmentalLeverage.com

Be careful with salt. We had one plant use too much salt onsite, and the melted runoff wound up impacting the biological activity. Salt will lyse the cells if the concentration is too high in the water, and it will kill the bacteria. BOD and TSS will significantly increase.

This plant used 500 lbs to help empty some tanks. Please note, the smaller the plant, the less salt it takes to upset the bacteria in the system.



Build-up around pumps and aerators can make mechanical equipment harder to run or easier to break down.

Ice build-up on wires and hoses



Channels can freeze up and block the flow



The biggest issues at the end of winter and the beginning of spring are heavy flows. Not only can this cause hydraulic overload, but many times, especially for municipalities, it can wash excess solids or grease from the pipes and collection systems.

Grease can make its way through the pipes and cause blockages.

The biggest thing with excess grease is the overload to the wwtp which can cause increases in foaming and filamentous bacteria. Foam will freeze quicker and can cause many problems.



Maintenance of frozen foam is not fun. Whether it is in the aeration basin, lagoons, channels or in the clarifier, foam and filaments due to grease rises to the surface, does not mix well, sits there longer and eventually freezes on the surface.



One way to get rid of grease is to supplement temporarily with bioaugmentation products to help reduce the grease loading.

Biological activity increases and decreases with temperature changes. For every 10°C change, the activity of the bacteria changes one logs growth. Make sure that you are prepared for the decrease in activity as the temperature cools down. D.O. requirements will decrease as activity goes up, so you may be able to save some electricity and run your aerators at a lower speed.



MLSS values will need to be adjusted and possibly raised in your system. Clarifier beds need to be monitored and adjusted and they might need to be higher, since you will need to carry a higher inventory if your plant gets serious impact from cold weather. pH will need to be monitored as activity decreases. Nitrification may slow down. If this is critical at your plant, you need to be very aware of this.

Some plants, especially industrial facilities that are out in the middle of nowhere and get extremely cold temperatures, often use steam injection directly into the basins in order to keep the biological activity up. The steam can kill the bacteria that come in close contact with the direct injection, but the overall increase in temperature across the system significantly increases biological activity.



Many plants can also experience an upset condition with dispersed growth and filamentous bulking every winter when colder temperatures promote the growth of some filaments such as *Microthrix parvicella*.



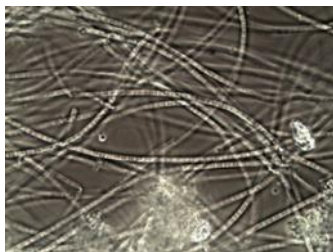
Many plants with lagoons system that do not have the ability to increase their RAS and decrease their WAS in order to build up a MLSS in the system turn to bioaugmentation during the winter months. This is a very cheap, efficient way to increase the amount of bacteria in the system and increase the degradation capabilities of the system.

The bacteria are fed based upon flow, temperature and BOD loading and are only used to take up the slack that the existing bacteria in the system cannot handle. They are then discontinued during the warmer months.

Bioaugmentation is also used to supplement tank remediation, industrial facilities with activated sludge, but with extreme changes in flow and BOD loading that are so significant that the RAS cannot be changed quickly enough to help with the additional loading.

Be careful with MLSS numbers also. If you wind up with filamentous bacteria vs. floc formers, your "MLSS" numbers may give you false impressions of how many bacteria you really have.

Floc that has filaments may take up 3-5 times the volume of mass that floc formers take up. You are not getting 3-5 times the treatment; there are holes and spaces in the volume. Imagine a sponge with a lot of spaces. If you use volume or mass balance as a way of measuring MLSS, keep this concept in mind. Check under the microscope. You may need more mass or active bacteria to do the same amount of work! See our Wastewater Operations newsletter-



Use your microscope daily, it is more accurate than any numbers can ever get close to! The bugs will change quickly in hours and react to any spill, and will tell you long before there are major problems. Think about it, their life growth cycle is generally 20 minutes to 2 hours. They can grow and multiply that quickly. They will react quickly and indicate changes needed. If you need to keep a medium to older sludge age, instead look at your floc structures, whether you have stalked ciliates and rotifers vs. rotifers and worms.



Base your solids and wasting schedule on what the bacteria are telling you as opposed to what a calculator is telling you! The bacteria could care less what the numbers say on your calculator. Use the microscope! Then make adjustments!



Clarifiers can be tricky in the spring. Just when you think the temperature is normalized a cold spell can hit, or vice versa, a hot spell can come through. The warmer the temperature the more biological activity. This means if you are holding extra solids due to colder temperatures and all of a sudden it warms up, you can easily run out of oxygen in the clarifier and wind up with TSS. This does not mean you are young, medium or old sludge, it just means your activity sped up and you have less oxygen for the amount of solids you are holding in the clarifier. You have to decide whether to return or waste water.

If you are interested in an audit of your plant, microscopic analyses, training or consulting on how to handle things in the winter or want to start a bioaugmentation program, call Environmental Leverage Inc. today!

Upcoming Training Classes

Please let us know if you would like to set up a private class/Audit at your own facility as our schedule is filling up quickly.



April

Illinois - Fox Lake

April 17th & 18th, Tues. & Wed., 2018

8am - 4:30pm both days

Filamentous Identification -The Easy Way™!

Village of Fox Lake Illinois

200 Industrial Ave

Fox Lake, IL 60020 USA

June

Florida - Tavares

June 11th & 12th, Mon. & Tues., 2018

8am - 4:30pm both days

2 Day Biological Wastewater Treatment Seminar

Utility Administration Building - City of Tavares

1000 Captain Haynes Road

Tavares, FL 32778 USA

Check out our new Elearning Website www.WastewaterElearning.com/elearning

All new training classes have been approved in more states. More to come

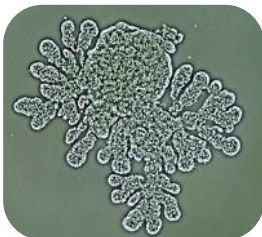
These courses have been pre-approved for Wastewater CEU's in Alaska, Arkansas, California, Connecticut, Delaware, Georgia, Hawaii, Idaho, Indiana, Louisiana, Maine, Massachusetts, Minnesota, Nevada, New Jersey, New York, North Carolina, South Dakota, Tennessee, Vermont, Washington, Wisconsin and West Virginia.

Some states do not require pre-approval. If you need these approved for your state, please contact our office.

These courses are eligible for CEU's, Contact Hours or PDH (Professional development hour) in Alabama, Arizona, Maryland, Virginia, South Carolina, Utah and more to come.

Now approved in Canada for Nova Scotia and **Saskatchewan**.

****Some states give different credits than others. Not all states give credits solely based upon contact hours. Please contact our office if you need to know the approval codes and credit hours for your specific state.**



Did you guess what this was? This is fingered zooglea. Zooglea can make wet slimy sludge that is hard to dewater. Zooglea usually indicates either low pH, low nutrients or recent high BOD. Spring melts can flood the collection system and cause high levels of grease and oils to come down to the wastewater treatment plant and cause foaming and zooglea, filaments, high BOD and TSS.

March- Zooglea

Check out our website for more photos of our new mystery bug!!!!

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