

January 2018

The Wastewater Insight



Dissolved Oxygen requirements in various parts of the Wastewater Treatment plant?



Oxygen Requirements

Oxygen in aerobic biological treatment is a basic part of the growth cycle. Oxygen is required both for the development of new cells and to meet their continuing energy requirements in order to degrade organics and nutrients. How much oxygen do you need? Oh wait, mixing is just as critical as oxygen. Always keep things moving.

Let's walk through the biological system and see where oxygen and mixing can make a huge impact on how your facility works more efficient and well as effective. Let's start upstream at the source of the wastewater. For municipalities, you cannot go all the way back into the houses, hotels, hospitals, etc. but you can start at the lift stations. For industrial facilities, don't just start looking at the effluent side of your treatment plant, go upstream. Do you have channels, lift

stations, man holes or holding tanks on-site? Make sure to open up all tanks and look inside.



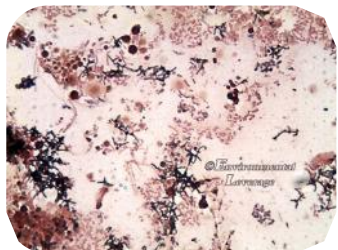
Here are some good examples from industry where small changes make huge impacts.

This is a lift station at a beverage facility right off the maintenance building. Notice how much black oil is present? Quite a bit that is not really part of production. At this site, using a small MicroBlock with slow release bacteria will help break down some of these oils before it gets to the treatment plant. Minor change, but huge impact to the system.

This photo is from a juice factory. Very low pH and no nutrients. They were actually clogging up a 2 mile pipe to the city for this plant. A little bit of pH adjustment, some nitrogen and a bioblock solved their plant issues.

Sometimes, mixing upstream in the wetwells, or lift station is the main problem as the lift station is turning septic. Sometimes, just a minor adjustment to the levels by raising or lowering the float can move water faster in the system. Some plants install a small venturi pump and splash plate to make a simple poor mans aerator and get a waterfall effect. This helps to increase circulation and introduces air.

There are tons of new equipment for lift stations or holding tanks to increase air and mixing. Anytime you let wastewater sit, it will start to grow bacteria. If there is insufficient air or mixing, it may start to turn septic and generate odors. Check out the internet or WEFTEC.org for the latest equipment. Here is one example of some of the newer technology.



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



This is a bakery with serious septicity



Here is a drain at a corn factory, again notice the black scum



This is in a receiving dock, notice the oil in the rail car lines, black scum and gassing evidence



Maintenance is critical even in small areas that you would not think of. Septicity not only can generate odors, but it can increase COD values, increase oxygen demand later downstream in your wastewater plant, and cause the growth of filaments and zoogea, sometimes even upstream. When this mess finally does get washed down and into the sewers and into the wastewater system, it can cause problems. Minor changes to a maintenance schedule can help lower costs and issues later that arise in the wastewater plant or collection systems.

Always keep in mind the critical 5, whether upstream in the plant, collection system, primary or even downstream in dewatering and digesters. Bacteria don't care where they are, they will start growing anywhere there is food. They start growing upstream the minute the water leaves the process, whether that is a house, hotel, or production facility. 20 minutes to two hours is typical bacteria growth cycle, so it does not take long for bacteria to start growing anywhere, even in the pipes.

If you have a nice flow in the collection system, usually you will get mixing and some aeration while the wastewater moves through the pipes down to the wastewater treatment plant. Your collection system can become an extension of your wastewater treatment plant. Double check though the critical 5, especially mixing and air. If you have a long line with little flow, maybe small adjustment to the float on the lift station and move it quicker through the system. Maybe a mixer or venturi in a particular lift station will help.



School in the Caribbean



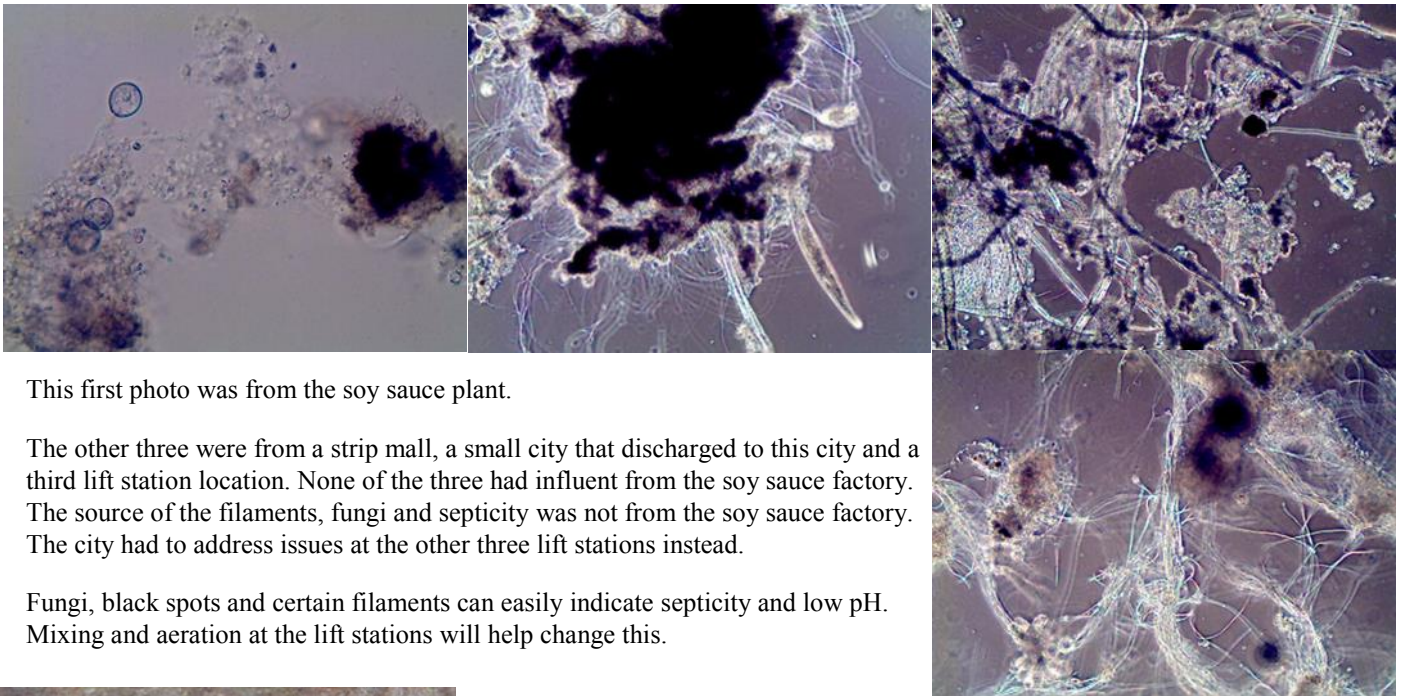
Hospital in Caribbean islands

Rust and corrosion usually are a sign of septicity. Notice the black floc and gassing. Grease build-up in a lift station can be addressed with numerous minor changes. A bioblock, mixer, nutrients, pH adjustment. Any or all are relatively minor things to adjust in the collection system, yet can have a huge impact on odors, COD, solids handling and operations downstream.

Take a walk through your plant if you are an industrial facility. Check lift stations, manholes, wetwells, collection tanks or pits. Make sure all move quickly or look at making minor changes. If you are a municipality, work with your industrial facilities, hospitals, hotels, restaurants.

Keep in mind, you can use the microscope to troubleshoot upstream as well. We had one city that had an industry upstream and they assumed the filaments they had at the wastewater treatment plant were due to poor operations at the industrial pretreatment lagoons.

We took the plant personnel as well as the municipality personnel and collected samples from their 4 lift stations. We looked under the microscope at each to see if anything was growing upstream in the collection systems .



This first photo was from the soy sauce plant.

The other three were from a strip mall, a small city that discharged to this city and a third lift station location. None of the three had influent from the soy sauce factory. The source of the filaments, fungi and septicity was not from the soy sauce factory. The city had to address issues at the other three lift stations instead.

Fungi, black spots and certain filaments can easily indicate septicity and low pH. Mixing and aeration at the lift stations will help change this.



We had another city that was continually having to rod out the sewer lines twice a week or it would back up into houses along a particular line. The only industry was a lawn mower blade factory. They assumed since they only were working with metal it could not possibly be their fault for the sewer slime.

The city had their collection system that had serious issues with sliming. Here is a case of a stretch of over 1-2 miles that a city had where the pipes were growing a large biofilm directly in the pipes and had to jet out the lines weekly.

Significant levels of slime were visible, and sometimes long "ropes" of slime and biomass could be seen snaking through the pipes.

Twice a week in the summer, the maintenance crew had to come and jet out the lines and were stumped as to why they kept growing 7 ft long "sewer" snakes and backing up the sewers into houses along the line. The biofilm, if not jetted out weekly, would build up enough to block off the mains and the laterals.

We went with the city personnel and the plant personnel and took a tour of the



production facility. We did find the causes of the issues in the collection system.

Cutting oils have a very high BOD. The rinse pits then would collect this oil and sit in drains for months before finally being cleaned out or discharged to the sewer once or twice a year. There was gassing evident in the rinse tanks as well as serious black growth, odors and gassing in the drain pits. Recommendations were made to clean out the pits more frequent. Adjust pH in the final pit prior to the sewer, add a small bit of fertilizer so the bacteria had a source of N and P, and hang a small bioblock with slow release bacteria to start the degradation process.

Keep in mind the Critical 5 always when looking for a solution, especially mixing and aeration. Next month we move on to the Primaries and Secondaries oxygen and mixing requirements.



Product Corner

FOG (fats, oils & grease) can build up in pipes, lift stations, grease traps & wetwells. When FOG cools to ambient temperature it can cause float problems, grease ledge or create large chunks which cause flow blockage problems as well.

FOG is a carbon with very high BOD and the bacteria will consume it. As long as there is food present for the bacteria to grow, they will grow in the collection systems. Without proper mixing or aeration odors can occur. Odor becomes a big issue when your environment becomes septic.

Applying bioaugmentation MicroBlocks, liquid or free flowing powdered bacteria can keep your system clear of these issues. Biological products offer a more efficient alternative to chemicals. They actually degrade the grease and organics at the source while significantly reducing malodors. The bacteria also will help breakdown amines and organics.

There are tons of issues with collection systems, lift stations, wet wells and wastewater treatment plants. We have staff that can help you with product application. We are always a phone call or email away to assist. With this information you can think of some possible things that might be going on in your system and a few options that are available to you besides constant maintenance and chemicals. Sometimes a small amount of preventative maintenance or proactive treatment can eliminate some of the repetitive maintenance.



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, Georgia, Idaho, Indiana, Louisiana, Maine, Massachusetts, Minnesota, Nevada, 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 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 a flagellate. It is a bit hard sometimes to see the flagella. This was taken at 1000x. Most of the times at 100x flagellates can be missed. Make sure to check your MLSS at 400x, especially if you recently got hit with a high BOD loading. Flagellates indicate a younger sludge, and high BOD.

[December - Flagellate](#)

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

EnvironmentalLeverage.com

Environmental Leverage
812 Dogwood Drive
North Aurora, IL 60542

Phone: 630-906-9791
Fax: 630-906-9792
E-mail: ELFEnvironmental@aol.com