

June 2017

The Wastewater Insight



April and May showers may bring flowers, but it also can mean severe problems for some wastewater treatment plants!

Hydraulic washout	Insufficient BOD removal
Flooding and infiltration	TSS carryover
Grease problems	Temperature changes
Clarifier overflow	Less than optimum tertiary treatment
Solids washout	



Excessive rain can easily cause hydraulic washout in any system. Rains and hydraulic overload can impact many different parts of a plant.

Heavy rains can cause numerous issues even in a lift station for municipalities.

Rain can wash off high levels of oils on the roads where construction occurs. Cars can drip while stuck in traffic waiting for lanes to change or even parking lots can have oils washed into the system. Rain also can cause huge chunks of grease to dislodge in sewer lines and lift stations to make its way down to the primaries of a wastewater treatment plant. This can cause foaming if it makes its way downstream in the plant due to *Nocardia* and *Microthrix*, which thrive on excessive oils and grease.



Check your primaries, if you have the skimmers that need to be adjusted by hand, make sure you do it more often after high rains to pull out as much grease as possible. Definitely, make sure someone comes in on the weekend if you normally run your plant only 5 days a week to pull the grease off the primaries. Many plants overlook this and build up too much grease on the weekends and come in to the plants on Mondays with many problems.



Grease that breaks off can increase the BOD loading on the aeration basins or digesters. This can overload them and cause the growth of filaments, which can cause serious problems. Higher BOD can also make it harder to meet permit limits. Did you know grease can have a BOD of 1-2 million ppm? Check it out, run .1 grams in a COD digester. It might surprise you how much loading can come from such a small amount of grease or oil.



Try to remove as much of the oil and grease in the primary as possible.

Industries can also have issues with rain. Primaries can easily get overloaded. Very rarely are primaries, EQ tanks, aeration basins or secondary clarifiers covered, so rain easily impacts these processes.



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



Many times high rains can bring down mystery objects that wind up down the sewer or even an excessive level of leaves and debris.

Screening should be able to catch most of this. If instead it makes it way to the primary, make sure to do some maintenance on your screens.



Here is a flooded drain at an industrial facility. Obviously solids have built up. Notice the gassing occurring, indicating septicity due to biological activity.



High rains, hurricanes or flooding can cause clarifiers to washout easier than many of the other parts in the system. This can cause the beds to rise and float out over the edge of the clarifier, losing a critical amount of your MLSS.



Hydraulic washout can cause problems in the primaries as well as the aeration basins. Washing out too much of the MLSS from the aeration basin as well in the secondary clarifiers can also make your biomass younger. Remember, it is always a time and numbers game in the aeration basin and wastewater system. You are shortening the time by filling up the volume with more water, so you will need to keep an eye on the numbers.

While the carbonaceous bacteria can recover relatively quickly, the nitrifiers, if washed out, will take quite a while to rebuild up a significant amount of numbers capable to handle the plants influent nitrogen loading. Waste less if this happens, and try to return a thicker recycle if possible.

Some plants often have to use bioaugmentation cultures for quick re-seed if necessary. Bioaugmentation cultures may be the carbonaceous bacteria, or nitrifiers, if really necessary. Let us know if you need help with determining that. We do offer biological products for situations such as this.

Some plants have an EQ tank, a diversion tank, or empty aeration basins or clarifiers that they can divert some of the excess flow during high rains in order to bleed some of the water back into the system after the high rains have stopped. This is the best case scenario and allows the plant time to recover from the heavy rains, without causing any washout or loss of MLSS and efficiency of the plant. As long as you do not hold it too long without mixing and aeration and cause septicity issues. Some plants are not allowed this luxury and instead have to work with their system and increase MLSS in order to handle the higher loading and washout.



Flooding and infiltration can occur easily in the spring and fall. This can oftentimes increase the BOD or decrease it depending upon the content of materials that are washed in with the rain. Watch your BOD loading, your nutrients and

use your microscope. The bacteria will tell you whether you need to increase wasting or decrease wasting.

Many plants have a set volume for the amount of sludge they keep in the clarifier. This is a big mistake. The amount of sludge you need to carry should be based upon the loading to your plant and it may vary many times. You can use a settleometer and check the volume of MLSS, but what if it is young bacteria vs. old bacteria. A MLSS of 2000 is not always the same! If your bacteria are young, they take up a certain volume due to dispersed floc, young fluffy sludge. If you waste based upon a fixed volume, your bacteria will get even younger and you will be making it worse.



On the other hand, if the MLSS is old, they often times are more dense compact floc.

They take up less volume. What if your plant is old, and you only have 1 ft. of old sludge instead of the 2 feet you normally carry. You think it is young and try to hold more sludge, Your MLSS was already old and now you are making it older by trying to meet a set number of bacteria. Sooner or later it will be too old, and you will have tons of pin floc and it will carry over and out into your effluent. Do not use a MLSS number only for the amount of sludge you need to keep in your clarifier. Instead look at the bacteria. Quality vs. quantity is more important! What is the quality of the 2000 MLSS? Is it young or old? Is it full of filaments or floc or zooglea and fungi?



Older sludge vs. young, clear, fluffy sludge vs bridging filaments

Municipalities and some food plants that have to disinfect prior to discharge are significantly impacted by high rains and hydraulic overload. If the flows are too high and run too fast through the systems, especially if they have UV or ozone, they might have a hard time meeting final tertiary permit levels. A typical 3-4 MGD plant can sometimes get as high as 10-15 MGD flow with very heavy rains! That is incredibly hard on a biological plant to handle.



One day it is 80, the following week 55, and rainy. Hail even, temperatures fluctuate so much in the spring and fall, that it does impact the biological process at many plants. Keep in mind that for every ten degree change, you may have up to a logs growth in biological activity. Some plants need more MLSS with colder temperatures and less in the warmer months. How do you combat this and predict how much MLSS to carry when you the weather is constantly changing? It is easier to waste a bit really fast then try to instantly grow up more bacteria. Be conservative on the wasting to try to meet a "specific" target MLSS.

Keep in mind also your clarifiers. Clarifiers are designed to be able to hydraulically hold only so much solids and liquids. When the temperature is a bit colder, you can hold more solids as oxygen transfer efficiency is better. In summer months, not only are the bacteria in a higher growth stage, but it is harder to keep oxygen in the system. Clarifiers are not sterile, so it becomes a fine balance in how much bacteria do you need, how much oxygen is present in the clarifier and how much gassing and ashing will occur if you hold too much, or too long or have too little D.O. to start with.



Insufficient D.O. levels in a clarifier can lead to gassing ashing and then floating solids. Make sure to scrape down support structures, struts and weirs as well as bacteria like to attach to something.





Excess rain can cause short circuiting in clarifiers.

Drying beds are obviously not working well in high rains.



Migration brings birds. Ducks in an aeration basin, Ibis in lagoons, even ducks in clarifiers. With birds and animals, comes increase waste loading with high nutrients and pathogens.

Make sure to watch your plant and all the variables during the rainy season. If you need help with looking under the microscope, let us know. We can teach you how to use the microscope in order to run your plant easier and more efficiently.

We do offer personal training or have classroom training that we can provide, as well as our training materials, so there are three options!

Contact us at Environmental Leverage Inc. if you are interested in starting a bioaugmentation program to help your wastewater treatment system today!

2017 Class Schedule

We have just set up four new wastewater courses. You asked, we created.

New locations to make it easier to travel to. If you cannot travel, we also now have more courses on our ELearning.

Washington, California, Alaska and Iowa

All of these courses have been pre-approved for CEU credits

Some of these courses have limited sizes, so reserve your spot now.

June

Washington Tri Cities wine country
June 21st & 22nd, Wed. & Thurs., 2017
8am - 4:30pm both days

1-2 Day Biological Wastewater Treatment Seminar

Best Western Plus Pasco Inn / Kennewick Area
2811 North 20th Ave.,
Pasco, Washington, 99301, USA

July

California- East of San Francisco
July 13th & 14th, Thurs. & Fri., 2017
8am - 4:30pm both days

2 Day Biological Wastewater Treatment Seminar

GVI Training Facility
5711 Griffith Ave.
Livingston, CA 95334 USA

August

Alaska- Anchorage
August 9th & 10th, Wed. & Thurs., 2017
8am - 4:30pm both days

2 Day Biological Wastewater Treatment Seminar

AWWU Eagle River Wastewater Plant
15524 Artillery Road
Eagle River, AK 99577 USA

September

Iowa- Quad Cities
Sept. 13th & 14th, Wed. & Thurs., 2017
8am - 4:30pm both days

2 Day Biological Wastewater Treatment Seminar

QC Analytical Services Training Center
1798 Iowa Drive
LeClaire, Iowa 52753 USA

Please check our website or email us for a registration form. Please let us know if you would like to host a class in your area.

New Training development- Check out our new wastewater ELearning classroom.

Now you can take classes from the comfort of your own office. Online classes save money, travel time and expenses as well as the fact that you can learn at your own pace. You can go ahead and set up a free account and take the few virtual demo. Then you are ready to choose your classes from our list currently or as the new ones come up and go online. We already rolled out the first set of training classes. Stay tuned for more information on upcoming classes. . . .

We will continually be adding new courses to the ELearning. Let us know if you have a special topic you would like to see covered.

<https://www.wastewaterelearning.com/elearning/index.php>



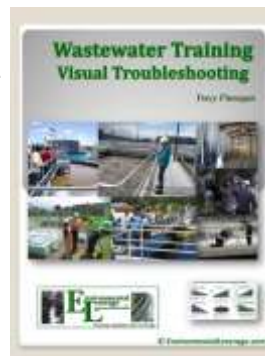
These courses have been pre-approved for Wastewater CEU's in Alaska, California, Connecticut, Indiana, Maine, Nevada, New York, North Carolina, Vermont and Washington. Some states do not require pre-approval. If you need these approved for your state, please contact our office.

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.

New release February 2017 and updated classes just added.

Coming soon, Nitrification/Denitrification and Clarifier

Filamentous ID the Easy Way in the Fall



Yep its microtubules can move. Did you guess what this was?
This is a Suctorian. When suctorian are dominant, it usually means a very good sludge age. Usually we see this with final effluent levels of BOD at 10 or less, so it means you are doing a good job at your facility!

[May 2017- Suctorian](#)

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