# September 2016

# The Wastewater Insight



# **Collection System Issues and Solutions**

Anything and everything that is dumped down the drain winds up in the sewers and lift stations, from grease, garbage, toilet paper, human waste and food to industrial waste. Fast Food restaurants are adding significant loading to a collection system as well.

A collection system is not a sterile environment. As long as there is food for the bacteria to grow, they will grow in the collection systems. The real control is in making sure the right types of bacteria grow in the collection system.

Basically, the collection systems can be thought of as one large holding tank or equalization tank prior to the Wastewater Treatment Plant. Many municipalities have miles and miles of pipes, and numerous lift stations prior to a wet well, and then the actual wastewater treatment plant. Maintenance on these pipes can be costly and time consuming, as well as incur some safety concerns.

Bacteria, if given even the slightest chance, will grow anywhere there is sufficient food. Typically, there always is some type of small biofilm in all sewer collection pipes. Usually the growth is slow, due to low BOD loading and high flow of water causing enough movement or



even pressure from the lift stations. The biofilm is relatively small, and sloughs off quickly with rain and normal flow. In effect, a miniature RBC unit can be created in the collections systems with the right conditions. Typically, the flow is enough to cause the biofilm to slough off without causing problems.



In cases where easily degradable organic compounds are discharged to a system, a very rapid biomass growth can occur. If the industrial or institutional discharger uses large amounts of rolling or cutting oils, grease or sugars in the processes, has dipping baths where biofilms are allowed to grow, or septic water is allowed to collect in tanks onsite, and then this is discharged into the sewers, the bacteria in the system will quickly grow on these types of substrates. If the optimum environment is not present, such as sufficient N, P or lower pH, or sufficient mixing and dissolved air, then a slimy biofilm will develop instead of floc.

Remember, bacteria need what we call the Critical 5 regardless of whether they are in the pipes, in a holding tank, the sewers at the plant or the final wastewater treatment plant.

**OPTIMUM** 

77 - 95 ° F

7.0 - 7.5

1.0 - 2.0 mg/l

2.0 - 3.0 mg/l

1.0 - 2.0 mg/l

Ok, so what exactly are the "Critical 5 plus one"? I have never heard of that.

There are 5 critical measurements that should be monitored and controlled to effectively run a biological treatment plant efficiently; Temperature, DO, Ammonia, Ortho-phosphate and pH. But anywhere upstream where biological activity occurs, they are just as critical!!

ACCEPTABLE

>0.5 mg/l

50 - 95° F

1.0 - 3.0 mg/l

0.5 - 2.0 mg/l

6.0 - 9.0

Acceptable environmental parameters for biological activity including:



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

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#### Page 2

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Typically most sewers have a pH of around 7-7.5. Mixing and flow through the pipes generally give enough DO to the system. Temperature is not usually able to be changed, but is not too bad. Since most pipes are well below the freezing level underground, activity will slow in the winter, but never freeze up. N and P are high in normal household waste due to human biosolids, but when high industry or institutions, such as hotels, restaurants or strip malls with fast food restaurants are around, then these variables can get out of line and cause problems.

What are you growing in your pipes? What are some of the problems and solutions for your wet wells and collection system?

Problems:	Solutions:
Grease build-up	Raise float
Septicity	Add nutrients
Corrosion	Add bioaugmentation
Odor Control	Increase air and mixing
Filaments and Zooglea	Raise pH
Solids build-up	Screening







Let's take a look at some pipes, wet wells, collection systems and lift stations and see just what can happen

In the examples below you can see not only grease in the water, but growing on the walls of the pipe and up into the collection system.

In these lift stations you can see a grease ledge on the side of the lift station, floating turtles, oil and build-up growing around the pipes, chains and floats. In some lift stations, hard grease balls or "floating turtles" will form. These can block up pipes and cause problems with pumps if allowed to grow too large and cause obstructions.



#### THE WASTEWATER INSIGHT www.environmentalleverage.com

Issue 12.9 Page 3



Some lift stations can get significantly crusted with thick grease and solids. Lift stations can be extremely small or up to 5 million gallons a day! Obviously, the larger the lift station or wet well, and the longer the holding time in the vessel, the more solids and grease and biofilm that can build up. Some lift stations even have multiple chambers, as you can see in the these 2 images.







This is a manhole 20 feet from a small restaurant. Look at how much grease and solids are built up in this small area. This restricts the flow and eventually may cause problems in the restaurant with back-ups. The solution - a small amount of bacteria (Environmental Leverage MicroClear<sup>™</sup> 207 bioaugmentation product) was mixed in a bucket of water and poured directly on the surface of the grease to clean out this manhole. It worked!



Continual dosage will be required weekly, though since there is no source for recirculation and it gets washed out periodically. Ongoing maintenance kept the manhole from ever building up so many solids again though! A slow release MicroBlock<sup>™</sup> which hangs below the liquid level, will also work for 24/7 dose.





MicroClear<sup>™</sup> 207 MicroBlock 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. The biofilm, if not jetted out weekly, would build up enough to block off the mains and the laterals. The city had an industrial facility that manufactured metal parts. One of the things used when cutting metal parts is rolling and cutting oils. Their wash water was discharged in the pipes and sent to the city wastewater treatment plant. They actually had two plants in this city, and at both locations, the same thing occurred in both parts of the lines directly after the plant discharges. If any industrial plant has a very high BOD loading, or even one with simple sugars that are easily degradable, and ample time in

> the pipes to grow, you will get significant growth in your pipes and lift stations. In this case, the flow was low, but the loading



Next month we will cover alternative options to frequently jetting out lines!





## Our two new fall Wastewater training classes are now set up.

New Fall Training Class San Francisco Area Biological Wastewater Activated Sludge Process Control Seminar

Sept. 27th Tues. & Sept. 28th Wed.- 2016 8am - 4:30pm both days

This 2-day (16 hours) course is pre-approved in California as Training for Wastewater Operators, Engineers, and Laboratory personnel.

This seminar will present the process control methodologies and laboratory techniques necessary to control the activated sludge process with an emphasis on process monitoring and trouble shooting. These approaches are equally applicable to domestic and industrial facilities. Past participants from industries such as Food and Beverage, Wineries, Chemical, Paper and petrochemical have been successful in applying these methods to control their processes. The course will consist of lecture, plant audit, and demonstrations of certain laboratory procedures.

#### **Course Materials**

Richmond, CA 94801

Each attendee will receive complete class notes and a Wastewater Microscopic Training CD... valued at \$250.00.

Register early, class size is limited! Seminar held at: West County Wastewater District 2377 Garden Tract Road

Lunch will be provided both days by West County Wastewater District

California Course is approved for 16 CEU's hrs. Other states may have different credit systems.

## Please be sure to bring a 100ml - MLSS sample from your own facility

# It's Finally Back! Filamentous Identification The Easy Way<sup>™</sup> 2-Day Hands on Class!!

October 18 -19th 2016 8:30am – 4:30 pm

The course is designed for all wastewater professionals, particularly operations personnel, such as operators, engineers and laboratory personnel.

The course size is limited to the first 20 people for this class.

#### Course Materials

Each attendee will receive complete class notes & our latest version of Filamentous Identification The Easy Way™" A Training CD valued at \$395.00

Register early, class size is limited! Seminar held at: City of Glenwood Springs RWWTF 2315 Wulfsohn Rd

Glenwood Springs, CO 81601

Lunch will be provided both days by City of Glenwood Springs RWWTF

For additional information & registration contact: Tracy Finnegan or Staff at (630)-906-9791



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

We have spent the last two years working on creating our 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 form 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.





Did you guess what this was? This is algae. Anytime you see any green in your system unless you have ponds, it does not belong there. Usually it will occur on sidewalls, weirs or sand filters. Usually any type of aeration basin with high MLSS is too dense for the sun to penetrate and cause algae to grow. Make sure to clean weirs if it is on your clarifier, as algae can slough off, end up in a BOD bottle die in the dark for five days, and cause you to have higher BOD and TSS levels.

#### August 2016- Algae

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

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