



Turning Liabilities into Leverage

June 2013

The Wastewater Insight

MYSTERY BUG OF THE MONTH



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

Inside this issue:

Chemical vs. Biological	1
Bug of the month	1
<u>Upcoming Class</u>	4
Last Month's Bug	4



Fats, oil and grease - - also called FOG in the wastewater business - - can have negative impacts on wastewater collection and treatment systems.

Most wastewater collection system blockages can be traced to FOG. Blockages in the wastewater collection system are serious, causing sewage spills, manhole overflows, or sewage backups in homes and businesses.

Federal pretreatment regulations (40 CFR 403.5(b)(6)) specifically prohibit petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through. However, the federal regulations are silent on other types of oils and greases and very few cities have regulations that specify limits and enforcement of oil and grease (lipids) discharges from restaurants. Many things have caused an increase in oils that wind up down the drains and into wastewater collection systems. Changes in temperatures in dish washers as well as home use of more garbage disposals has had a big impact on oil. Industries use of lubricating oils in production automation is another area. Construction on roads and infiltration of rain into collection systems containing oil from cars and trucks on roads is another issue. . This impacts both industrial as well as municipalities.

Grease traps were designed to capture grease from hotels, schools, restaurants, etc. Grease traps are not very effective if the temperature is too high. The temperature of the grease trap effluent should be less than 85°F in order to facilitate the separation of the oil fraction from the water. Changes though by the federal government raising dishwasher temperatures to higher temperatures have caused problems with existing grease traps. Most of the water is too hot and the grease is still dissolved in the water as it leaves and enters into the collection system.

NSF/ANSI Standard Number 3 mandates for all types of commercial dishwashers the maximum temperature for the final sanitizing rinse to be 195 degrees F.

The attached link is a really nice summary of grease issues for municipalities

<http://tn.gov/environment/wpc/publications/pdf/GuidanceDoc.pdf>

In the past, chemicals such as solvents, detergents, caustic and acids were used to "degrease" lift stations and collection systems. The problem with chemicals is that they really do not make the grease disappear.



They may force the grease to leave one spot that you can visibly see, but usually all that happens is you force the grease to move downstream and become someone else's problem! Many times, pipes got clogged, the municipality got a huge slug of grease that upset the plant and more problems were created than actually solved by using the chemicals for grease control. Harsh chemicals can also cause corrosion in the pipes and pumps. This caused many municipalities to ban use of many chemicals in the lift stations and collection systems.

To make matters worse, now too many people use "disposable wipes" for cleaning everything from their hands, kitchen counters, cars, changing diapers, etc. Disposable does not always mean flushable. Cleaning wipes and baby wipes do not "dissolve", but they do get stuck in sewer pipes and sewer pumping equipment and help to "trap" more grease as well.

Some products combine **chemicals with "enzymes"** vs. actual bacteria species such as those used in bioaugmentation products.

Enzymes are not living things. Enzymes are proteins that act as a catalyst. The enzymes are responsible for accelerating the rate of reaction. In general, each type of enzyme catalyzes usually only one type of reaction and will operate on only one type of substrate. This is many times referred to as a "lock and key" mechanism. As a result, enzymes are highly specific and are able to discriminate between slightly different substrate molecules. In addition, enzymes exhibit optimal catalytic activity over a narrow range of temperature, ionic strength and pH. Enzymes are also used up in the reaction. Also, enzyme reactions may be a reversible chemical reaction.

Bacteria on the other hand "generate" their own enzymes. They continually grow and reproduce and create new enzymes, thus becoming an "enzyme factory" right in the system.

Here are just a few of the more common chemicals that you may have seen or heard about to use for grease removal. Orange Float, Orange citrus, or more commonly known as *Delimolene* or **d-Limonene**.

d-Limonene is used in cleaning products as a solvent.

d-Limonene is the major component of the oil extracted from the citrus rind during the citrus juicing process. When the fruit is juiced, the oil is pressed out of the rind, then separated from the juice and distilled. Some products combine other chemicals with the orange citrus.



Orange Float is a flammable chemical. It does not degrade the grease. It does not prevent grease from forming; it only keeps it from "collecting" in one spot. If grease is already in the system, it just pushes it down somewhere else. It also adds extra COD to the system. It is more expensive than biological products also.

Orange Float Floating Citrus Degreaser is a chemical that was used often in the past in lift stations prior to bioaugmentation alternatives.

Orange Float is a specially formulated, non-emulsifying solvent for the control and elimination of scum blankets and grease balls in lift stations, wet wells and holding tanks. Orange Float MSDS sheet: **WARNING! COMBUSTIBLE. CAUSES EYE IRRITATION** Combustible liquid and vapor. Keep away from heat, sparks and flame

Name of Hazardous Ingredients CAS number % by Weight

D-LIMONENE; orange distillate; citrus terpene; cyclohexene, 1-methyl-4-(1-methylethenyl)-,(R)-5989-27-5 >95

Some grease removal products contain even more harsh chemicals. Some products use other chemicals in combination such as solvents, surfactants, caustic or acid based chemistries.

Drain devil — liquid drain treatment. A fully inhibited heavier than water liquid drain treatment containing virgin sulphuric acid to quickly dissolve all organic obstructions.

POWER PLUS — Granular Drain Opener and Cleaner Formulated for opening sewer lines, drain lines and grease

traps. When activated by water POWER PLUS generates heat, agitation and a chemical reaction which digests debris and pushes the unwanted obstacles out of the drain.

This liquid drain treatment contains virgin sulphuric acid to quickly dissolve all organic obstructions.

There are many other brands of chemicals used for cleaning and sanitation. Check the labels and chemistries used. MSDS sheets are a good source to check out not only the chemical, but the hazards associated as well.

Bioaugmentation along with the addition of nutrients is one way to help upstream in your wetwells, manholes or lift stations to reduce grease and lower BOD. Bioaugmentation products are naturally occurring bacteria. They are not hazardous chemicals.

How do I add bioaugmentation products to help degrade oils and grease?

Lift stations, aeration basins and digesters may have grease. Digesters commonly end up with build ups of grease due to solids and floating grease from the primary being sent to the digester.

Grease is one waste that the sewer system cannot handle and therefore needs to be kept out of the system, but most often is not.

Biological additives are a safe, natural, environmental friendly way to help assist in the cleaning up of a lift station, but they are not miracle workers. There is a limit to what they can do, how they do it and when they will work. Bacteria can naturally degrade the fats, oils and grease, as well as most other organic materials that enter a lift station or pipe. They actually consume these as a food source, as opposed to traditional methods of surfactants, enzymes or chemicals that may have eliminated the grease in the lift station, but just transferred them down the pipe and eventually into the wastewater treatment plant and can cause upset conditions. Biological products cannot in a realistic time degrade some of the solids such as plastics, condoms, etc. that wind up in the lift station or the treatment plant. Some of these eventually build up and must be physically removed.



Bacteria not only clean the lift stations if properly applied, they can help clean up the lines and can lighten the load at the treatment plant and help with BOD and TSS loading. Again, it is all in the program addition; conditions such as flow, temperature and loading impact whether a program will impact just the lift station, the pipes or the treatment plant alone. It is always a time and numbers game in wastewater biodegradation. With bioaugmentation, you are cheating and supplementing the numbers. Depending upon where you add the bacteria, especially the further upstream you add them, the more time you are allowing the bacteria to degrade the organics. Please let us know if you have issues with grease and oils. We can help design a program for your specific site. MicroClear® 1X-FHC liquid solutions of specially selected multi-cultured bacterial strain concentrate. These enzyme catalysts work synergistically for the fastest action available in a liquid digestant using nature's own cleaning agents.



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MicroClear® 1X-FHC contains a synergized blend of Bacillus organisms, all of which has been selectively chosen for accelerated degradation capabilities of organic compounds such as grease, fats, proteins, starch, sugars, and cellulose. Developed for Wet wells, Drains and Grease Trap Liquid.

A Bio-Brick is an improved biological product, specifically formulated and packaged for use in lift stations. To assure optimal performance of these organisms, under the toughest conditions, they are produced and blended together with "high potency" nutrients and stimulants. Bio- Brick also contains specialty penetrants and surfactants, which loosen and liquefy heavy grease or oil deposits.



Call Environmental Leverage if you need help with grease and oil removal.

We still have some openings in our two Day Biological training class. Keep in mind this location is a short distance away from Napa and Sonoma if you are planning other trips around the class!!!

Delta Diablo Sanitary district

Lunch will be provided compliments of **Delta Diablo Sanitation District**

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

Activated Sludge Process Control Seminar by Environmental Leverage® Inc.

July 15th & 16th 2013

8am - 4:30pm both days

2-Day Seminar held at:

**Delta Diablo Sanitation District
2500 Pittsburg/Antioch highway
Antioch, CA 94509**

CEU's available where applicable

Are Wastewater Treatment problems getting to you lately?



Don't miss this opportunity to increase your knowledge of biological process control and learn how to troubleshoot and optimize your plant.

General Information
Registration check in is at 7:45am July 15th
2-Day course begins at 8:00 am to 4:30 p.m.

Lunch will be provided compliments of Delta Diablo Sanitation District

Registration
You may register by email, telephone or fax:



Environmental Leverage® Inc.
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North Aurora, IL 60542
Phone: 630-906-9792
Fax: 630-906-9791
Email: elfenvironmental@aol.com

The Instructor
Tracy Finnegan is an Environmental engineer with Environmental Leverage® Inc., Illinois. She was formerly associated with Nalco and Suez, where she worked for more than 12 years in numerous positions related to research, operations, design, evaluation, auditing and troubleshooting. She now operates her own Environmental Engineering Company that supplies products, training, audits and services.

www.EnvironmentalLeverage.com
Tracy has taught biological wastewater process control to operators and engineers for over 20 years and performed audits and troubleshooting for ~5000 industrial and municipal treatment plants. Tracy holds a BS degree in Business Chemistry from Northern Illinois University. She is a co-author in WEFTEC's Book Wastewater Biology: The MicroLife, and has now developed 12 new wastewater Training CDs.



Course Location:
Delta Diablo Sanitation District
2500 Pittsburg/Antioch highway
Antioch, CA 94509
For additional information contact:
Tracy Finnegan (630)-906-9791

Biological Wastewater Treatment 2-Day Seminar
Activated Sludge Systems
July 15th & 16th, 2013

Register early, class size is limited!
2-Day seminar held at:
Delta Diablo Sanitation District
2500 Pittsburg/Antioch highway
Antioch, CA 94509



A Seminar Sponsored by



Delta Diablo Sanitation District



Class is limited so register early.
Email: elfenvironmental@aol.com



Last Month's

MYSTERY BUG OF THE MONTH



Mystery Bug of the month!

Last Month's Bug of the Month

Did you get this right?

This is a Loricifer. A stalked ciliate with a shell. This means a stable medium sludge age.

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

[May 2013 Bug - Loricifer](#)

EnvironmentalLeverage.com

Please call 630-906-9791 or email elfenvironmental@aol.com to request registration form

or follow this link

http://www.environmentalleverage.com/training/Delta_Diablo_2013_2dayOperator.pdf

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