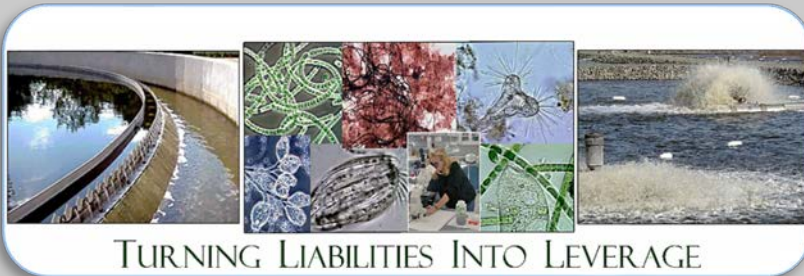


Case Histories & Capabilities

Environmental Leverage[®] Inc.





Northern Papermill Lagoon



Before and after, nutrient optimization, Aerator optimization, clarifier optimization, bioaugmentation and micronutrients supplemented.





Papermill Bioaugmentation

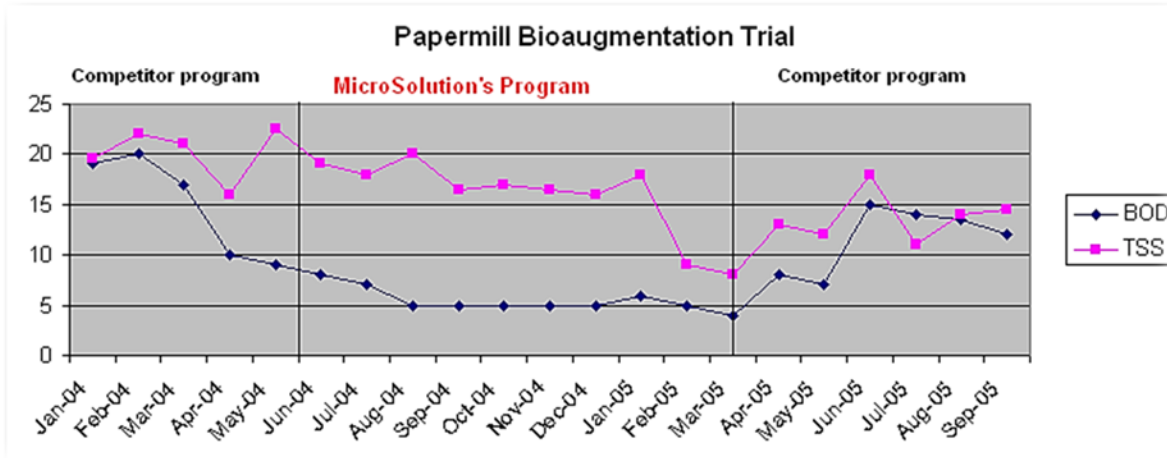


We were asked over to come in and troubleshoot for a paper mill with a once through lagoon. We made some process recommendation, gave some training and switched their current bioaugmentation program to a Dual Program. The final effluent had the best BOD in the history of the plant while they were on our program. But, since the plant was on a "sole source" agreement with a major supplier of all their chemicals, they were forced to go back to their original supplier for biological products. Well, after just 6 months, the plant is back on our MicroClear® products and Dual program. The results could not even come close on their program!

While we believe some of our products are specially formulated and are very good, the major thing we believe is important is the training, consulting, analyses and support that we have to offer. But the real proof is in the final BOD number! Check to see how we compare. . . .

BOD final permit limits were 25 and TSS numbers are 30 ppm. We consistently hit close to 5 ppm BOD once the program was up and running! Very good for a paper mill! Even the cold weather months with a normal slowdown in activity, the BOD was still on the mark!

The TSS variable was not something that could really be as easily correlated between trials, since it is more a function of the primaries. During both trials, they just installed a number of new thickeners, and a new sludge recycle pump during various points in this trial. While TSS can be a driving issue and impact loading on the plant, it was harder to correlate between both companies, you could say the loading was higher in the trial, but BOD was the real clincher.



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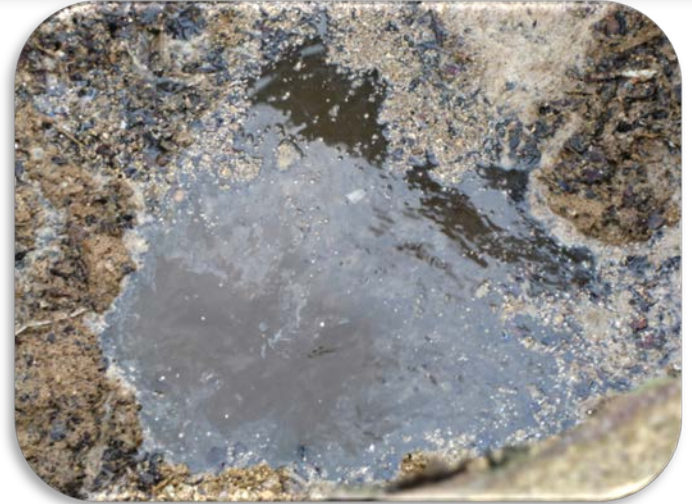




Papermill Lift stations



Bioaugmentation used for Grease & oil removal upstream in drains, channels & lift stations.



Lower right image shows lift station clear of FOG.





Primary Clarifier Optimization

Solids handling

Upstream optimization

Oil beneficial reuse

Septicity and odor reduction





Southern Papermill Clarifier Optimization & Solids Reduction



Holding solids too long

Upstream reduction of grease and oil

Beneficial reuse of fly ash, boiler ash & lime





Bioaugmentation & Micronutrients



MicroSolv™ 118
*High Potency /
Bacteria Product*

**MicroClear®
M100**
Micronutrients

Lower
Cost

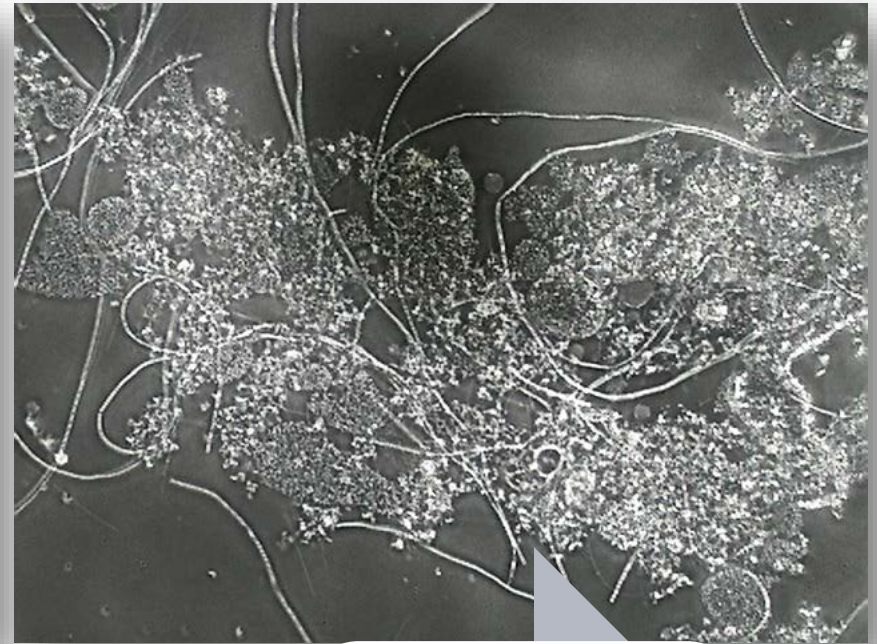
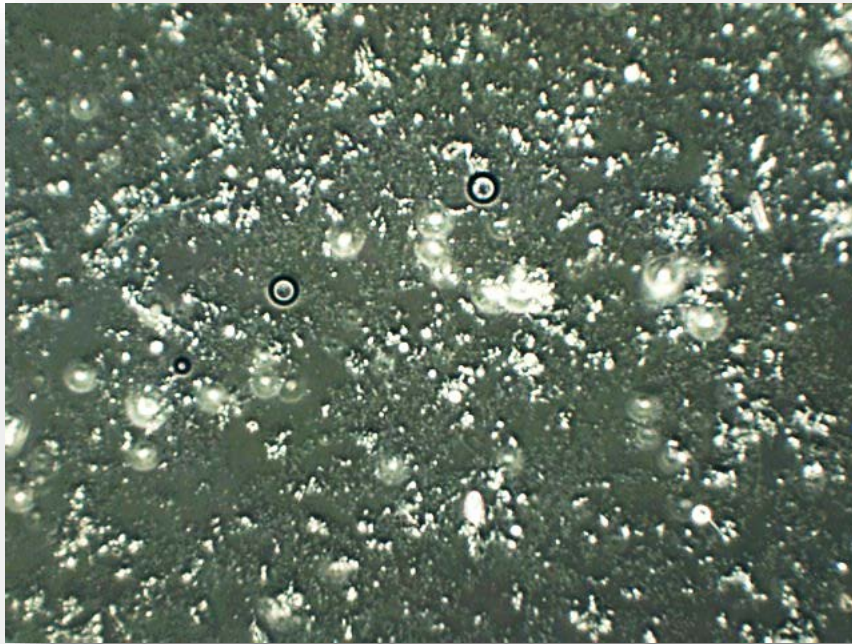
Higher
Efficiency

Dual
Program





East Coast Paper Mill Solids Handling Reduction



Nutrient
Optimization

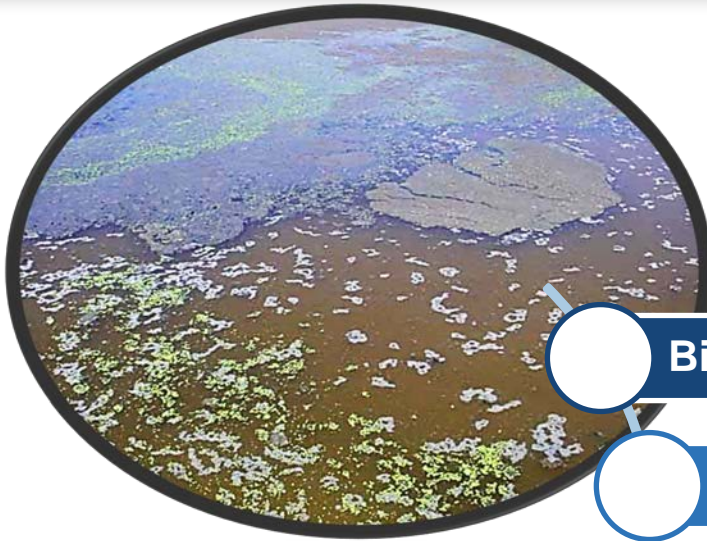
Bioaugmentation

Filament &
Zooglea
reduction

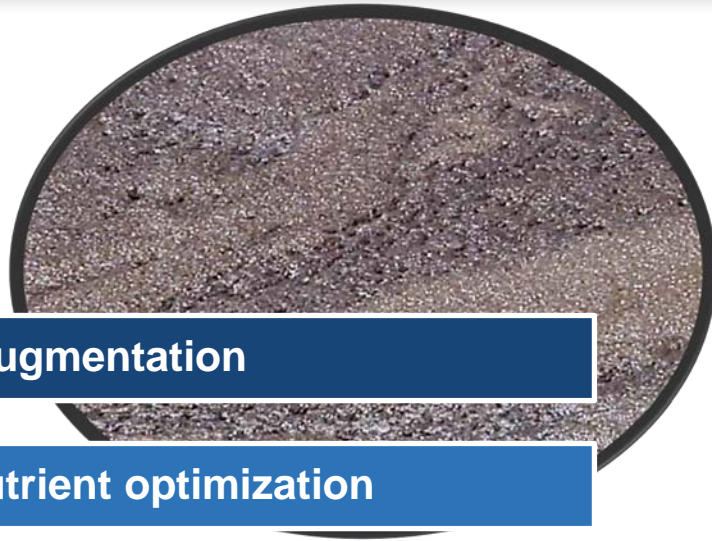
40 - 60% Solids
handling reduction



Lagoon Dredging Cost Reduction



Bioaugmentation



Nutrient optimization

Primary clarifier optimization



Upstream FOG reduction





Beneficial Reuse Papermill

- Fly Ash and Boiler ash
- Lime
- Pulp in primary clarifiers



- Black Liquor can be a big problem at wastewater treatment plants at papermills. The chemical components are of particular interest due to the fact that a spill can have an adverse impact on the biomass in the system. If the spill is large enough and passes through the system, the impact on the receiving water and the aquatic life present might also be of concern, not to mention any emissions of TRS and HAP's to the air that black liquor also might contain. Usually black liquor is not toxic to the bacteria in a system though. A spill usually means tons of high food loading, white foaming may be seen on the lagoons or aeration basins, but high BOD or TSS can be present in the effluent if the system is not properly adjusted to handle the spill. On the other hand, Green liquor or white liquor spills can be toxic to a system in some cases.





Papermills in Vietnam and Japan



Unable to reduce BOD/COD sufficiently
MicroBlock used upstream in lift station
Bacteria and Micronutrients used in MLSS





Environmental Leverage

The Next Generation of Solutions



- **Chemicals, Laboratory, Training, Consulting, Total Systems Approach**
 - Onsite Audits & Consulting
 - Beneficial Reuse & Biosolids Alternatives
 - Training Programs
 - MicroClear® & MicroSolv™ Bioaugmentation Products
 - Cooling Tower & Wastewater Lab Services
 - Computer Based Dosing Wizards
 - Wastewater Audits
 - Online ELearning Courses





Wastewater Audits



Full audit of Treatment plant, or "Virtual Audits"

Evaluation of Equipment, Process Recommendations, System Optimization, Troubleshooting, Testing, Solids Handling, etc.

Sample audit report page 1 showing header information, a table of data, and a photograph of a wastewater treatment facility.

Sample audit report page 2 showing a detailed process flow diagram and a photograph of aeration tanks.

Sample audit report page 3 showing photographs of equipment, a table of performance metrics, and a bar chart.

Sample audit report page 4 showing a bar chart, a table of costs, and a photograph of a building.

Sample audit report page 5 showing a table of data, a photograph of a building, and a photograph of aeration tanks.

Sample audit report page 6 showing a graph of Dissolved Oxygen Rate vs Temperature, a photograph of aeration tanks, and a photograph of aeration tanks.

Sample audit report page 7 showing a photograph of aeration tanks, a graph of Dissolved Oxygen Rate vs Temperature, and a photograph of aeration tanks.

Sample audit report page 8 showing a photograph of aeration tanks, a photograph of aeration tanks, and a photograph of aeration tanks.

Sample audit report page 9 showing a table of design criteria, a photograph of aeration tanks, and a photograph of aeration tanks.

Sample audit report page 10 showing a photograph of aeration tanks, a photograph of aeration tanks, and a photograph of aeration tanks.



Wastewater Training Programs



Wastewater Training Materials 4 – CD Set

Higher Life Forms CD

Filamentous Bacteria CD

An Overview of Wastewater Training

Wastewater Microbiology

Filamentous Identification



The Easy Way™ Training CD

Powerful Filamentous Training


Custom Training CD or Manuals

Microbiology Training

“How To Use The Microscope”



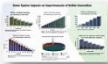



Training & Hands On Workshop
Presented by Tracy Finnegan



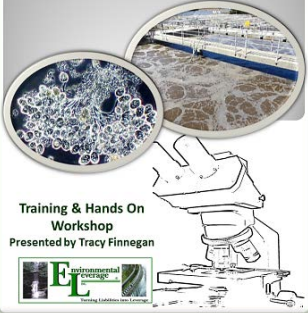
Wastewater Training Visual Troubleshooting

Tracy Finnegan






© EnvironmentalLeverage.com

Microbiology Training In Wastewater




Training & Hands On Workshop
Presented by Tracy Finnegan




Microbiology Training


Indicator Organisms




Training & Hands On Workshop
Presented by Tracy Finnegan



Troubleshooting Microbiology




Training & Hands On Workshop
Presented by Tracy Finnegan





Microbiology Training

“Filamentous Identification The Easy Way”





Training & Hands On Workshop
Presented by Tracy Finnegan

An Overview of Wastewater Treatment

CUSTOM TRAINING MANUAL

Author Tracy Finnegan



Wastewater ELearning Training



Online ELearning: Wastewater Training Courses Overview

Control and Minimization of Total costs of operations is always necessary, but guaranteed reliability and long term sustainability are the keys to transport your wastewater treatment system above and beyond normally targeted measures. These wastewater training programs are based upon years of experience and accumulation of practices on actual performance of thousands of treatment systems. These wastewater training programs have been consistently successful in teaching people how to be proactive and achieve their goals of reducing Total Costs of Operation while also achieving compliance.

You will learn step by step procedures which will enable you or your operators to develop quick, easy to establish system checks to control and monitor your system in order to predict upsets, minimize energy and chemical usage, and avoid costly repairs and unnecessary maintenance procedures.

These courses have been pre-approved for Wastewater CEU's in Alaska, Arkansas, California, Connecticut, Delaware, Georgia, Hawaii, Idaho, Illinois, Indiana, Louisiana, Maine, Massachusetts, Minnesota, Nevada, New Jersey, Kentucky, New York, North Carolina, Rhode Island, 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.**

Just Released ***

Secondary Clarifiers, Secondary Biological Wastewater Treatment systems, Nitrification and Denitrification, Spanish Wastewater Basics, Filamentous Identification Introductory Course Coming Soon :Filamentous ID the Easy Way

- Online computer-based training
- Interactive courses with videos, photos, & quizzes
- Convenience and flexibility at individual pace
- No travel expenses or hassles.

WastwaterElearning.com/elearning

www.EnvironmentalLeverage.com



Environmental Leverage Analytical Services



- Wastewater Biomass Analysis
- Filamentous Identification
- Cooling Tower Microbio Analyses

Environmental Leverage Inc.

Wastewater Microbiology Lab Testing

Standard Wastewater Biomass Analyses :

- Cover letter with comments, recommendations and troubleshooting tips.
- Higher life form sheet
- Floc structure analyses
- Photo Sheets
- A CD with photos and videos included \$250.00

Wastewater Biomass Analyses with Filamentous Identification including Gram and Neisser stains, suggestions on causes and control, troubleshooting tips as well as the standard analyses. \$350.00

Wastewater Biomass Analyses

Filamentous Identification

Filamentous Identification

Higher Life Forms or Indicator Organisms

Filamentous Identification Worksheet

Floc Characterization Worksheet

India Ink and LactoPhenol Cotton Blue Stains

Filament Causes and Controls

Send 50-100 ml sample in plastic container overnight. No ice cubes, blue ice only. Call to set up sample testing 630-906-9791. Results same day as sample received

Quality • Service

Always striving to bring the latest technology available to you!



TURNING LIABILITIES INTO LEVERAGE

- Training & Treatment Systems Audits
- Newsletters (*digital monthly troubleshooting*)
- Troubleshooting
- Filamentous ID.
- Higher Life Forms
- Bug of the Month
- Microscopic Biomass Analyses

Photo Gallery- Mystery Bug of the Month

Mystery Bug of The Month - From 2004 - 2017

Free swimming ciliates
 These photomicrographs were taken from a wastewater sample. Most of the objectives used were 100x, 400x and 1000x. You can see this free swimmer open what looks like a flap to capture food. Notice how when you go from low power to a higher magnification, more details jump out. Do not be afraid to go up to a higher magnification, even 1000x!

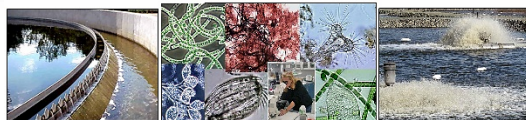
What's New!
 We now have a brand new "Higher Life Form videos" in our Training CD list. Check out our new Training Materials. We are also in the process of developing an "Online University" in order to meet the needs of our global customers that cannot travel to our public classes. Stay tuned for details and updates.



Join Environmental Leverage® on a Journey into the Future with our next generation of Water & Wastewater Treatment solutions

The future begins now. . . .

Environmental Leverage® Inc. bringing you Tomorrow's Water Today !!!!



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