

## Announcing a Powerful - "Must See" Workshop for Lagoon Operators and Wastewater Professionals

Discover new tools you can apply immediately to optimize your lagoon's performance and keep your system in compliance



# HOW TO TROUBLESHOOT LAGOON SYSTEMS

# WASTEWATER

APRIL 15th 2010

## The Latest Discoveries and Proven Techniques to Optimize and Solve Problems in Wastewater Lagoon Systems

The presenter at this workshop will be author & one of the Wastewater Industries' **TOP CONSULTANTS**, Steve Harris.



In this 1-day workshop you will discover new methods, techniques, and strategies you can use to get more BOD reduction, better TSS removal, odor control, sludge reduction, nutrient removal, and more years of dependable service out of the lagoon system you already have. In this workshop you'll discover:



- How to remove the greatest deterrent to your pond's treatment performance
- The keys to getting greater control over your lagoon system to remove more BOD TSS, and sludge
- The 11 possible causes of high BOD and their 50 possible solutions
- The 7 possible causes of TSS problems and their 44 possible solutions
- How to troubleshoot nitrogen removal problems
- How to get 12 inches of sludge reduction without dredging...and so much more!

**Increase your value as an operator by building effective diagnostic and problem solving skills**

Presented by:  
H&S Environmental, LLC  
1-602-810-7420



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# LAGOON TROUBLESHOOTING WORKSHOP AGENDA

8:00 am to 8:30 am Registration

8:30 am to 10:00 am **SECTION 1 - Wastewater Lagoon Microbiology**, the basics of how lagoons work to stabilize waste. Lagoon Food Webs, nutrient cycling and how water quality changes with changing depth. Variables affecting pond performance. The role of various microbes in a lagoon system. **Diagnosing Wastewater Lagoon Problems.** How to determine the source of lagoon problems. The eleven things an operator must know to troubleshoot or optimize a lagoon. The essential role of monitoring and record keeping in solving problems in a lagoon system. How pond chemistry changes over the day & year. Sampling locations and a discussion of the value of different tests. How to interpret test results.

10:00 am to 10:15 am Break

10:30 am to 12:00 pm **SECTION 2 - Diagnosing and Troubleshooting BOD<sub>5</sub> Problems.** Where and how to sample. The six steps to take to isolate the cause of a BOD<sub>5</sub> problem. Typical loading rates. How to tell if your lagoon can handle additional load from a new subdivision, jail, hotel, handle septage, or industrial waste. Understanding CBOD<sub>5</sub> vs. BOD<sub>5</sub>. Diagnostic BOD<sub>5</sub> Case studies from the field on solving BOD<sub>5</sub> issues.

12:00 pm to 1:00 pm Lunch

1:00 pm to 2:00 pm **SECTION 3 - Troubleshooting TSS Problems.** What is TSS? Algae related TSS problems. The benefits of algae. Algae's problematic side and in-pond strategies to remove algae. Methods for controlling algae growth. Lagoon colors and their meaning. Ingenious non-chemical methods for the removal of Duck weed. Case studies on algae suppression and growth from various cities.

2:00 pm to 2:15 pm Break

2:15 pm to 3:30 pm **SECTION 4 - Sludge Accumulation and Removal.** The problems accumulated sludge creates. Ten signs indicating it is time to remove sludge. Fifteen things that affect the rate of sludge accumulation. Typical sludge removal rates. How to determine the volume of sludge, sludge judging and core sampling. Things to consider before sludge judging a lagoon and how to prepare for this test. Formula for determining sludge volume and mass. How to Desludge a pond. Getting free sludge removal. Sludge removal costs and how to protect yourself. **SECTION 5 - Troubleshooting Aeration and Dissolved Oxygen Problems.** Factors competing for oxygen in a lagoon. How dissolved oxygen concentrations change in a lagoon and why that is important to you. Seventeen possible causes of low dissolved oxygen concentrations. Oxygen demand calculations. How to properly conduct a dissolved oxygen profile. Solutions to low dissolved oxygen concentrations. Troubleshooting low D.O. Case Study on how to solve odor and low dissolved oxygen problems.

3:30 pm to 4:30 pm **SECTION 6 - Pond Hydraulics.** How to calculate theoretical retention time and six things that cause short-circuiting in a lagoon system. How to tell if a pond has a short circuiting problem. Thermocline's role in short-circuiting and how to deal with water density problems. Confirming short-circuiting problems and how to solve them. Case study from city solving a gross short circuiting problem. Q&A, Wrap Up.



## Wastewater Lagoon Troubleshooting and Optimization Workshop



**Where:** Days Inn Conference Center,  
1900 I-70 Drive SW (I-70 & Stadium Blvd)  
Columbia, MO 65203  
Phone: (573) 445-8511

**When:** Thursday April 15th, 2010

**Program Schedule:**  
Registration: 8:00 to 8:30  
Workshop: 8:30 to 4:30



APPROVED BY:

**MISSOURI DEPARTMENT  
OF NATURAL RESOURCES**

COURSE # 1002416

**Operator Certification and Training Units**

Waste Water.....6.5 hours  
CAFO .....5.5 hours

### Registration Information

Enroll right away because seating in the Days Inn Conference Center is **VERY** limited.

Registration is on a first come first serve basis. Sign up and prepay now to insure you will get a seat.

Cancellations received up to 7 calendar days before the seminar are refundable, minus a \$25 registration service charge. After that, seminar fees are not refundable but can be credited to future seminars.



\*\*\*\*\* SIGN UP TODAY! SPACE IS LIMITED \*\*\*\*\*

Wastewater Lagoon Optimization & Troubleshooting, comprehensive 1- day workshop

1 day, just ..... \$99 per person

APPROVED BY: **Operator Certification and Training Units**  
**MISSOURI DEPARTMENT OF NATURAL RESOURCES** Waste Water .....6.5 hours  
CAFO.....5.5 hours  
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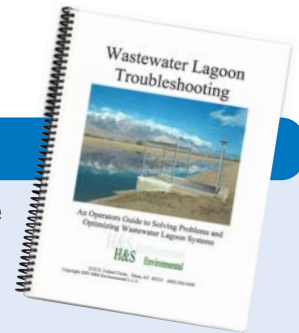
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**Class attendees can also get BIG DISCOUNTS on this manual!** ➔ ➔

This manual was written by your presenter Steve Harris specifically for this workshop. It is available for just **\$70** (normally \$79.95 plus \$9 shipping through USA BlueBook). The manual closely follows the workshop — it's like taking the workshop home with you to your plant.

If you would like to buy a manual, simply make a copy of this registration form, fill it out, & send it along with a check to: **H&S Environmental, LLC, 2122 E. Leland Circle, Mesa, AZ 85213**. Make check payable to: H&S Environmental. Credit card orders can be made by calling **1 (602) 810-7420** or on line at **www.lagoonops.com**. Books will be handed out the day of the class.

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