

Sustainable Solutions to Environmental Challenges

Case Studies & Success Stories ...

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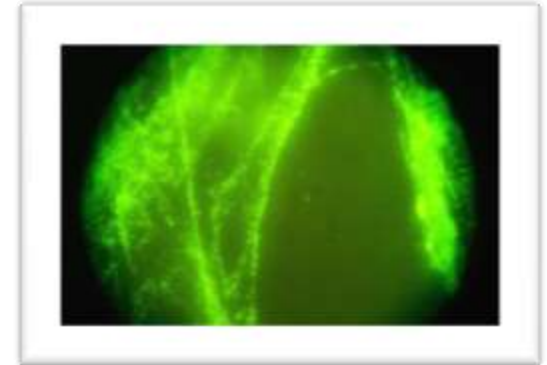
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TMD Bioremediation

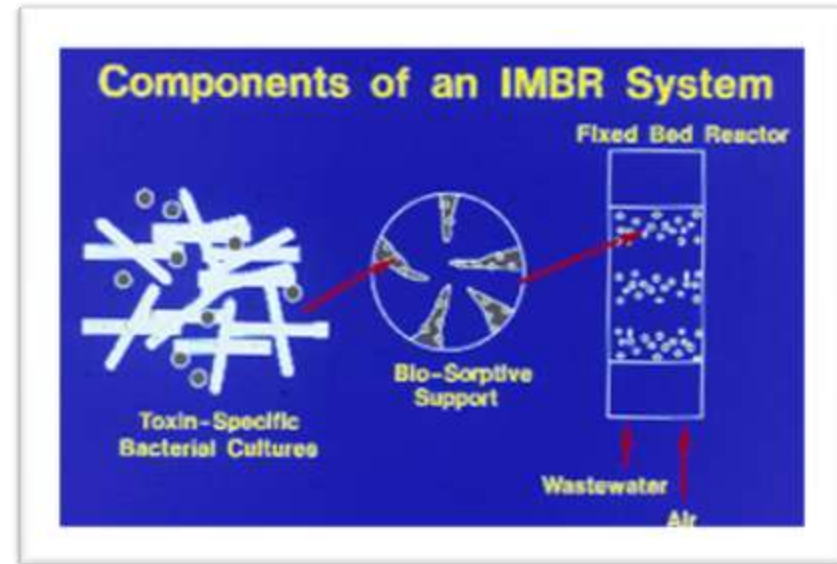
- The TMD Approach and Advantages
 - TMD Bioremediation
 - Bioremediation is (OTA Definition) “The act of adding materials to contaminated environments to cause an acceleration of the natural biodegradation process.”
 - Louisiana State University – Research Partner
 - Laboratory Research through LSU School of the Coast & Environment
 - 30+ years of microbial research
 - Two Forms of Active Treatment
 - Targeted Bioaugmentation
 - Biostimulation
 - TMD Processes Include Both



TMD Bioremediation

The TMD Approach and Advantages

- Patented Technologies and Processes
 - IMBR / Microbubble Generator
 - Enhanced Efficiencies
 - Faster Delivery of Results
 - Lower Cost
- Applied Science Approach
 - Field Testing Throughout Project
 - Application Rates Based on Laboratory Findings
 - Nutrient & Microbial Amendments Monitored for Best Results
- Flexible
 - Portable Systems
 - Multiple Delivery Options



TMD Experience

TMD Has Successfully Cleaned Hundreds of Contaminated Sites

- Thousands of Acres Remediated w/ varying restraints
- Multiple Contaminants
 - From PCB's to hydrocarbons to domestic wastewater.
- Flexible / Variable Application Methods
 - Bio-Plugs (In Situ Bioremediation)
 - Topical Spray Application
 - Production Water
 - Wastewater Treatment Systems



TMD Case Study

Deepwater Horizon
Oil Spill
2010

TMD Case Study



To provide the most effective support in as many locations as possible, ***TMD Mobile IMBR Units*** are placed in close proximity to treatment areas.

TMD is teaming with the **LSU AgCenter Grand Isle Oyster Hatchery** to access a workable local facility for microbe production, project coordination and visitor presentations.



Restoring Marshes



- TMD Targeted Bioaugmentation
 - Diagnose the Problem Methodically
 - Apply What is Needed, Where it is Needed
- TMD Grows Microorganisms in Large Quantities
 - Onsite or Near to distribution / treatment operations
 - Very high Concentrations
- Transport from Production to Application
 - Supply Boats
- Application / Treatment
 - Smaller Boats (Approx. 300 gallon Capacity)
 - Vegetable-Based colorant shows where areas are being treated
- Utilize Local Businesses, e.g., Fishermen, etc.
 - Transfers / Transportation
 - Application / Treatment

Beach Recovery



- TMD BioAugmentation Plan
 - Positioning IMBR mobile reactor systems strategically
 - Generating microbial amendment population onsite for beach treatment / distribution
 - Existing Local Maintenance Crews / Equipment
 - Remove heavily-oiled sand from surface (shallow)
 - Collected in Land Treatment Units (LTU) for TMD treatment
 - Cleaned / Treated sand returned for redistribution to beaches
 - Spray TMD microbial amendments and/or nutrients on beaches per application design

TMD Case Study

Oil Spill Lake Charles, LA

TMD Case Study

- Refinery in Lake Charles, LA
 - Natural Attenuation vs. Bioremediation Evaluated
 - Three treatments: Control, Biostimulation, Bioaugmentation
 - Three Treatment zones
 - Upper, Middle and Lower Indian Marais
 - TMD Patented IMBR as Microbe Generator
 - Seed containment pond / generate applied biomass
 - Application of Treatments
 - Topical liquid spray

TMD Case Study

- Refinery Oil Spill - Lake Charles, LA
 - Indian Marais Canal
 - Drainage Canals
 - Freshwater Wetlands
 - Storm Driven
 - Oil Contamination of Sensitive Areas
 - One Mile of Treated banks, vegetation and wetlands



TMD Case Study

The Results of the Oil Refinery spill remediation project were that the sites treated with the TMD microbial amendments proved successful at remediating the oil, as per LADEQ Risk Standards, from the surfaces at an increased rate of time – especially in the fragile wetlands.

TCH Measurements - Wetland Sample Locations

TCH Initial	3934 +/- 350
TCH-Final	12 +/- 5

TCH (Total Chromatograph Hydrocarbon) in mg/kg. Using Modified EPA Method SW846-8270.

TMD Case Study

Carpet Yarn Dyeing Facility Wastewater Treatment

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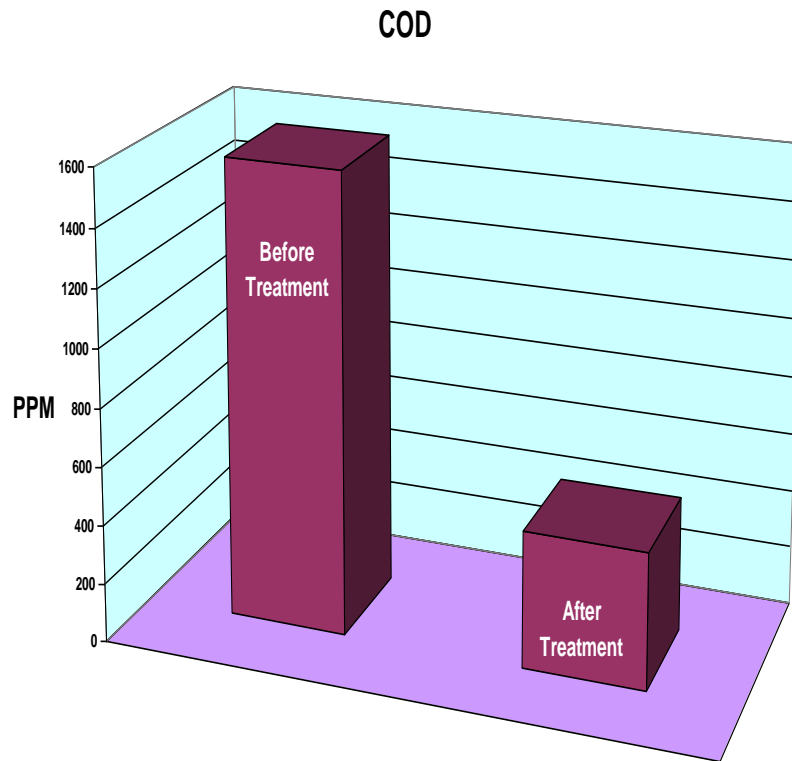


Carpet Yarn Dyeing Facility Wastewater Treatment



Carpet Yarn Dyeing Facility Wastewater Treatment

Wastewater Before and After Treatment



Technology-driven, cost-effective biological solutions
to challenges facing our global community.

For More Information ... Please Contact Us

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