

Hydrocarbon Remediation Technology



Dear Client:

OrganoCat and 3Tier scientists have developed a new, all-natural, highly effective and economical technology for hydrocarbon remediation called Soil Rx. The technology works using classic bio-remediation principles coupled with a new, Active Humic Technology as the base material. This new base material, developed by OrganoCat,

1. Builds a “scaffolding” around the oil using hydrophobic (water repelling) bond sites.
2. Stimulates hydrocarbon-oxidizing bacteria and protects them from the initial toxic effects of the oil.
3. Disperses the oil to allow for oxygen penetration and bacterial colony formation.
4. Enables the bacteria to contact and decompose the oil using the “scaffolding” and the hydrophilic (water attracting) bond sites on the base material.

An initial seeding of specific bacteria kick-start the process, followed by stimulation and rapid growth of native bacteria which decompose the oil into water, CO₂, and ultimately humus formation in soil, and active silt-like formation in water.

Soil Rx has been independently tested for toxicology and effectiveness using EPA standards with successful results. Furthermore, it has been tested on hydrocarbon UST site in Kentucky, land farming operations in Canada, oil refinery spills in Kentucky and elsewhere, producing consistent, effective, and economical bio-remediation of various hydrocarbons.

The key benefits of this technology are:

- **EFFECTIVENESS...** *Highly Effective Decomposition Of Petroleum, Chlorinated, Polycyclic Hydrocarbons*
- **IN-SITU REMEDIATION...** *No Need to Excavate Soils & No Dig-N-Dump Costs for Contaminated Soils*
- **ENVIROMENTALLY FRIENDLY...** *“Green” Remediation Technology & Added Benefits To Soil/Water*
- **REDUCED CLEANUP COST...** *Significant Labor & Application Cost Savings*
- **EASE-OF-USE...** *Can be Used Through Multiple Application Methods*

I invite you to review the accompanying materials after which time we can discuss in-person. I appreciate your time and consideration and look forward to discussing this further.

Sincerely yours,



Jeffrey L. Sangalli
Vice President and General Manager
OrganoCat LLC.



About OrganoCat

Bringing sustainable technology to life

OrganoCat is a green science and technology company focused on developing innovative materials, processes and applications to optimize the performance of and protect the soil and crops from existing agricultural products, and to remediate waste and toxins in water, soil and industrial byproducts.

We serve four core business segments- agriculture, energy production, general industry, and municipalities - and our technology directly supports the sustainability initiatives within these segments.

Our value is the intellectual property and expertise in developing materials, processes and applications that are synergistic, organic substitutes and enhancements for synthesized chemical products that meet the specific needs of our customers.

In the end, we want to provide a solution that is clean, cost effective and environmentally friendly, supporting our customers' sustainability initiatives.



Introduction

Oil, diesel, gas and other hydrocarbons are regularly spilled on the ground and in water throughout the world. Companies are looking for more sustainable and environmentally friendly solutions to clean-up these spills and return the contaminated area to a bio-remediated state. OrganoCat and 3Tier Technologies has developed a new solution to fulfill this need.

Soil Rx is a product that introduces new and powerful technology to the marketplace. Soil Rx has been tested in the lab and in the field, demonstrating consistent results of hydrocarbon remediation. Specifically formulated for safe, effective and environmentally friendly applications, Soil Rx is a cost effective solution for:

- ◆ Oil spill remediation around refineries, transfer stations, and for large, unexpected spills.
- ◆ Gasoline, diesel and jet fuel cleanup.
- ◆ Grease and motor oil cleanup.

Soil Rx utilizes a blend of activated humic acids, highly concentrated live hydrocarbon-oxidizing bacteria, and a biodegradable natural amino acid complex that work synergistically to degrade hydrocarbon contamination in-situ or in contamination holding sites.

This product has been tested for toxicology and bioremediation effectiveness per EPA standards. It has also been listed on the EPA's NCP (National Oil and Hazardous Substances Pollution Contingency Plan) Product Schedule under the *Bioremediation Agent* category.

The following pages provide basic information about application methods and rates, test results, product effectiveness, MSDS, and contact information.

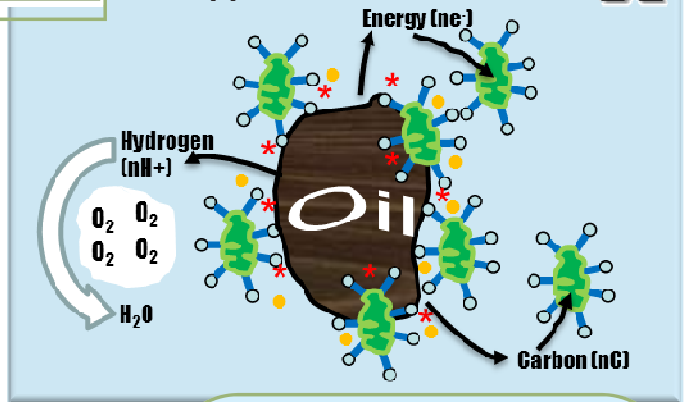
Humics Hydrophobic-Hydrophilic Model



Humics act as a scaffolding for microbes to attack oil

- * Enzymes
- Food Source
- Humics Coated Microbes

SOIL RX
How it Works



HOW IT WORKS

Oil Remediation

Soil Rx is a blend of activated humic acid (AHC), highly concentrated, live, hydrocarbon-oxidizing bacteria, and a readily biodegradable natural enzyme consisting of a nutrient-rich extract with a broad-spectrum package of identifiable enzymes, coenzymes, amino acids and other proteins.

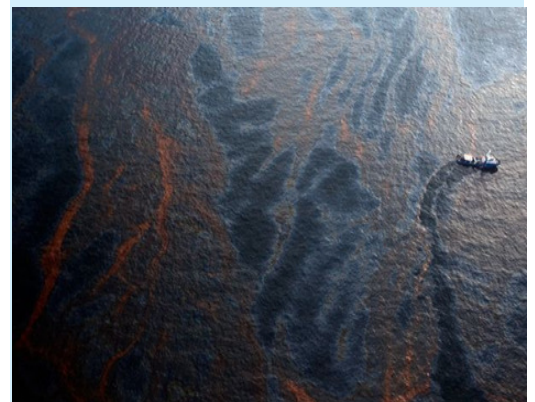
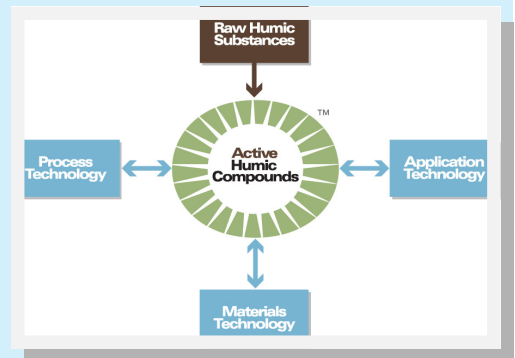
Since oil is hydrophobic (water repelling) by nature and most bacteria are hydrophilic (water attracting) by nature, they tend to repel one another. Over time, however, oil collects dirt, water and other types of materials, providing microbes a platform from which to decompose the oil. The AHC's found in Soil Rx provide an immediate "scaffolding" for microbes to attack oil.

AHC has both hydrophobic and hydrophilic sights, and thus can connect with oil and microbes at the same time. Additionally, AHC protects microbe's cells from the toxic effects of the oil. This combined action provides a platform from which the microbes can reach the oil, decompose the carbon-hydrogen bonds, and use the carbon for food and the electrons for energy. Hydrogen protons are released and bind with atmospheric oxygen to form water.

TREATING OIL IN WATER

Soil Rx can be used to treat oil in water. Once applied to the oil, Active Humic Acids interact with the oil, much like in soil, to provide a more favorable environment for microbial decomposition.

Learn more about the power of **Active Humic Technology** by visiting our website, WWW.ORGANOCAT.COM.



KEY STUDIES & EVALUATIONS

- *Soil Rx satisfies the requirements contained in Title 40 of the CFR section 300.915 of the NCP (National Oil and Hazardous Substances Pollution Contingency Plan). It is listed on the NCP Product Schedule under the Bioremediation Agent category and may be authorized for use by Federal On-Scene Coordinators in accordance with 40 CFR section 300.910.*
- *An independent, certified 24 hour acute toxicology study (LC50) was conducted in fresh water using the EPA 2000.0 test method. LC50 was reached at 18.75% dilute Soil Rx solution.*
- *An independent, certified 24 hour acute toxicology study (LC50) was conducted in salt water using the EPA 2000.0 and 2007.0 test method. LC50 was reached at 15% dilute Soil Rx solution.*
- *An independent, certified 28-day effectiveness study was conducted using the EPA Appendix C to Part 300 test method resulting in “a significant reduction in hydrocarbons” and a “strong correlation between Soil Rx microbial activity and hydrocarbon compound reduction.”*
- *A collaborative, in-situ remediation study conducted at a refinery in Kentucky on crude oil and gasoline spills on soil. The crude oil treatment area was tested using EPA Method 8021B & 8270C; the gasoline spill area was tested using EPA Method 8021B. All hydrocarbon compounds were reduced to below EPA Minimum Standards in 7-14 days.*
- *A hydrocarbon bio-remediation land farming (bio-pile) study was conducted in Canada. The test showed a 33-50% reduction in remediation time over competing products, meeting and/or exceeding the Ontario Regulation 153 standards. Additionally, the study resulted in a 25% increase in remediation production at a 27% material cost savings.*



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

NOV 17 2010

Mr. Daniel J. Burdette
3 Tier Technologies, LLC
2302 Mercator Drive
Suite 102
Orlando, FL 32807

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

Dear Mr. Burdette,

Thank you for providing the technical product data required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, on your product "Soil Rx (aka, Bio-Regen Hydrocarbon)." After conducting our review, your data submissions have satisfied the requirements contained in Title 40 of the CFR section 300.915 of the NCP. "Soil Rx (aka, Bio-Regen Hydrocarbon)" will be listed on the NCP Product Schedule under the Bioremediation Agent category and may be authorized for use by Federal On-Scene Coordinators in accordance with 40 CFR section 300.910. The technical data for this product will be kept on file by the Office of Emergency Management Regulation and Policy Division Oil Program Center pursuant to 40 CFR section 300.920.

Enclosed are some of the relevant provisions in the NCP on restrictions regarding the listing of your product. Please note, you are required to notify the Environmental Protection Agency (EPA) of any changes in composition, formulation, handling procedures, or application of your product. Based on this notice, EPA may require retesting of the product.

Also, note that the listing of "Soil Rx (aka, Bio-Regen Hydrocarbon)" on the NCP Product Schedule does not constitute approval, certification, authorization, licensing or promotion of the product; nor does it imply compliance with any criteria or minimum standards for such agents. Failure to comply with these restrictions or the making of any improper reference to EPA in an attempt to demonstrate approval or acceptance of the product will constitute grounds for removal of the product from the schedule.

Please review the enclosed information and contact Ms. Leigh DeHaven in the Office of Emergency Management at (202) 564-1974 if you have any corrections or questions.

Sincerely,

A handwritten signature in black ink that reads "R. Craig Matthiessen".

R. Craig Matthiessen, Director
Regulation and Policy Development Division
Office of Emergency Management

Soil Rx

"The Hydrocarbon Solution"



Product Overview Soil Rx utilizes a new approach to solving soil and water hydrocarbon contamination problems. Specifically formulated for safe, effective and environmentally friendly applications, Soil Rx utilizes a blend of activated humic acid, highly concentrated live, hydrocarbon-oxidizing bacteria, and a readily biodegradable natural amino acid complex consisting of a nutrient-rich extract with a broad-spectrum package of identifiable amino acids and other proteins. This triple action product works together synergistically to degrade hydrocarbons with minimal use of equipment, labor and cost. Soil Rx is a low-cost liquid, making it an easy-to-use, cost effective means to eliminate hydrocarbon contamination problems within various types of industry. Soil Rx is an excellent product to remediate hydrocarbons in soil and water. It is effective on gasoline, jet fuels, diesel fuels, grease, tar, motor oils, crude oils, organic solvents, etc.

Application Methods Soil Rx is a liquid concentrate that must be diluted prior to use. Soil Rx can be sprayed after dilution using standard spray application equipment including but not limited to hand sprayers, mechanical sprayers, water trucks, fire or emergency response equipment, pressure washers, aerial spray equipment, soil injection, well injection, wastewater injection, etc.

Soils Applications: Mix and saturate diluted mixture with contaminated soils thoroughly for maximum performance. For shallow/surface contamination, drench affected areas with enough dilution to fully saturate the soil using normal spray equipment or water trucks. For general contamination less than two feet, contaminated soil may require tilling or excavation to properly mix concentrate/water dilution into soils. For deeper contamination greater than two feet, product application can be applied through boring-n-pour method, soil injection, or on-site soil land farming and/or bio-piling.

Water Applications: For contaminated water such as marshes, shorelines and open water with floating hydrocarbons, apply dilution directly to the contaminated areas using appropriate spray equipment or water cannons. For wastewater systems, contact 3 Tier Technologies directly for appropriate treatment methods.

Application Rates Soil Rx must be diluted using 1 part concentrate to 10 parts clean water prior to use. Product can be diluted up to 100 parts water as directed for specific applications. Application rates are determined by level of contamination, area of application, and speed required for cleanup. Specific application rates are determined prior to sale by the manufacturer and/or distributor.

Soil: Standard application rate for contaminated soil is one gallon (5 liters) 10:1 diluted product per cubic yard (meter) of soil.

Water: Normal application rate for water applications is three gallons (12 liters) 10:1 diluted product per 1000 sq. feet (93 sq. meters) of contaminated surface area. Wastewater systems will receive application rates between 5 and 100 PPM of the average GPD or system volume.

Technical Information Soil Rx contains naturally occurring, single-celled, hydrocarbon-oxidizing microorganisms; a biodegradable natural amino acid complex consisting of a nutrient-rich extract with a broad-spectrum package of identifiable amino acids, coenzymes, and other proteins in a purified, highly active humic acid concentrate.

Product Effectiveness: The effectiveness and "speed" of this product is determined by several factors. In general, these factors are:

Temperature: Optimum performance temperatures range from 40°F (5°C) to 98°F (36°C).

pH: Maximum performance range is 5 – 9, acceptable range is 4 – 10.

Soil Moisture: Optimum soil moisture is 15% to 20% moisture content.

Remediation Speed: Factors that influence speed of process include type, level, depth, and age of contaminants as well as method of applications, regulatory standards, and urgency.

Performance Tips: Various strategies may be used to maximize performance like application rate & frequency, the addition of aeration, and method of application.

Shelf Life: Properly stored unopened containers have a shelf life of 2 years, 1 year after opening.

Benefits:

- No Need to Excavate Soils
- No Dig-N-Dump Costs for Contaminated Soils
- "Green" Remediation Technology
- Significant Labor & Application Cost Savings
- Can be Used Through Multiple Application Methods

For more information Contact:



2302 Mercator Drive, Suite 102, Orlando FL 32807 www.3tiertech.com

Bio-Regen Hydrocarbon



Product Overview **Bio-Regen Hydrocarbon** utilizes a new approach to solving soil and water hydrocarbon contamination problems with limited oxygen levels. Specially formulated for performance in aerobic, anaerobic and facultative environments, **BR Hydrocarbon** utilizes a special recipe of three distinct yet synergistic components, a blend of activated humic acid, a ultra high concentration of live synergistic bacteria, and a readily biodegradable natural amino acid complex consisting of a nutrient-rich extract with a broad-spectrum package of identifiable amino acids and other proteins. his triple action product is able to degrade hydrocarbons with minimal use of equipment, labor and cost. **BR Hydrocarbon's** liquid form and low cost make this an easy to use cost effective means for industries to eliminate hydrocarbon contamination problems themselves. **BR Hydrocarbon** is an outstanding product to remediate hydrocarbons in deep soil application, well, and wastewater applications. Use it on gasoline, jet fuels, diesel fuels, grease, tar, motor oils, crude oils, solvents, etc.

Application Information **BR Hydrocarbon** is highly concentrated and must be diluted with water prior to soil applications. Mixing must be done at 10 parts clean water to 1 part concentrate. Water between 42° and 120° F (6° and 50° C) gives you optimum performance. For applications to lakes, ponds, wells, or wastewater streams, product dilution is recommended.

Well Contamination: For well contamination, apply 10 to 100PPM of concentrate to the estimated water volume twice a month until levels of contamination are reduced to established thresholds. For maximum performance, it may be required to add air to the well. Extremely cold well water may increase remediation time due to reduced bio-activity.

Wastewater Systems: For wastewater systems, an initial shock treatment of the entire system will be required. Initial shock treatment will require calculating the total gallons in each part of the treatment system including holding tanks, treatment tanks, ponds, and lagoons. Each part of the system will receive a one-time inoculation dose. Thereafter, continuous dosing of 5 to 100PPM based on Gallons per Minute will be injected into the system. Contact a 3 Tier Technical Representative for a full system analysis and recommendation

Deep Contamination: Estimate total cubic yards (meters) to be treated. After determining the cubic yards (meters), plot out a grid every 5 to 10 sq. feet (1.5 to 3 sq meters) of the surface area. This grid will represent drill points and/or injection points for **BR Hydrocarbon**. Drill the wells to a depth that is within 12 inches above the deepest point of contamination. Insert 2 to 3 inch slotted PVC pipe into the drill wells. (Cap the bottom of the pipe prior to insertion) Mix **BR Hydrocarbon** at a 10 to 1 ration and fill all well pipes to the top. Periodically check pipes for liquid content (approximately every 5 days). Add diluted **BR Hydrocarbon** to maintain subterranean level. In approximately one month, there will be a drastic reduction in the contamination levels. Test the sites as dictated by local, state or federal requirements.

Tank Cleaning- For removal of volatile vapors and remediation of residual hydrocarbon tank fluids, dilute one gallon (4 liters) of concentrate in ten gallons (40 liters) of clean water. Through the top of the tank, liberally spray the inside of the tank. Let sit for 15 minutes and test tank air for volatile levels, repeat treatment if needed.

Technical Information

BR Hydrocarbon is an active mixture of hydrocarbon-oxidizing, naturally occurring, single-celled micro-organisms with a complete amino acid packet delivered in an activated humic acid solution creating a triple action "bio-remediation catalyst and support system". It is specially formulated to be safe and environmentally enhancing while being effective.

Product Effectiveness: The effectiveness and "speed" of this product is determined by several factors. In general, these factors are:

Temperature: Optimum performance temperatures range from 40°F (5°C) to 98°F (36°C).

pH: Maximum performance range is 5 – 9, acceptable range is 4 – 10.

Remediation Speed: Factors that influence speed of process include type, level, depth, and age of contaminants as well as method of applications, regulatory standards, and urgency.

Performance Tips: Various strategies may be used to maximize performance like application rate & frequency, the addition of aeration, and method of application. Contact 3 Tier for wastewater recommendations.

Shelf Life: Properly stored unopened containers have a shelf life of 2 years, 1 year after opening.

For more information Contact:



2302 Mercator Drive, Suite 102, Orlando FL 32807 www.3tiertech.com

Bio-Regen HC CLEAR™



Product Overview Bio-Regen HC CLEAR™ utilizes a new non-staining approach to solving hydrocarbon spills. Specially formulated for safety, effectiveness and environmental friendliness, Bio-Regen HC CLEAR™ utilizes a blend of an ultra high concentration of live synergistic bacteria and a readily biodegradable natural amino acid complex consisting of a nutrient-rich extract with a broad-spectrum package of identifiable amino acids, coenzymes, and other proteins. This bio-degradable dual action product is able to degrade hydrocarbons with minimal use of equipment, labor and cost. Bio-Regen HC CLEAR's™ liquid form and low cost make this an easy to use cost effective means for industries to eliminate hydrocarbon contamination, immediately renders fuel/oils inflammable, and clean up areas without surface staining.

Applications Bio-Regen HC CLEAR™ is a multi-use product designed to remediate a variety of hydrocarbons without any potential of surface staining. Use Bio-Regen HC CLEAR™ on gasoline, jet, and diesel fuels, and for over pours to immediately render the oil/fuel inflammable. Ideal for hard surface cleaning like gas station islands, parking lots, and areas with minor oil and fuel spills to eliminate fouled runoff to drains or the surrounding environment. A simple solution for soils and beaches that have been contaminated by oils, fuels, and other hydrocarbon based components. Bio-Regen HC CLEAR™ uses the same remediation technology as SOIL Rx without the Activated Humic Acid which could stain some surfaces.

Application Information Bio-Regen HC CLEAR™ is highly concentrated and must be diluted with water to work. Mixing must be at least 10 parts clean water to 1 part concentrate ratio. Water between 42 – 120F (6 – 50C) gives you optimum performance.

Fuel & Oil Spills-Hazmat: To immediately render any fuel or oil spills inflammable, dilute 6 to 10 oz. (177 – 295ml) of Bio-Regen HC CLEAR™ per gallon (4 liters) of water and spray area thoroughly. Upon contact, application will immediately knock down volatile vapors and breakdown hydrocarbon molecules. After application, please use proper spill containment and absorbents as needed for cleanup according to established guidelines for spill containment and cleanup. This application is also recommended prior to cleaning or for stabilizing tanks with volatile fumes from hydrocarbon contents.

Hard Surface Cleanup: For environmentally safe fuel pad, parking lot, and hard surface areas such as warehouse/shop flooring dilute 15 oz. (444ml) of Bio-Regen HC CLEAR™ per gallon (4 liters) of water and spray area thoroughly. Let area soak for a minimum of 30 minutes before washing area down. For best results, scrub with coarse brush and/or pressure wash the area.

Specialty Soil Applications: For applications to beaches, parks or play-

grounds, dilute 15 oz. (444ml) concentrate per gallon (4 liters) of clean water which will cover approximately 250 square feet (25 sq. meters). Dilute 5 gallons (19 liters) concentrate in 50 gallons (190 Liters) of water per 15,000 square feet (1500 sq. meters) of area. Multiple applications may be needed for heavy contamination.

Technical Information Bio-Regen HC CLEAR™ is an active mixture of hydrocarbon-oxidizing, naturally occurring, single-celled micro-organisms with a complete amino acid complex creating a dual action "bio-surface cleaning agent". It is specially formulated to be safe and environmentally enhancing while being effective.

Product Effectiveness: The effectiveness of this product and the "speed" at which it works is determined by certain factors. In general these factors are as follows:

Temperature: The warmer the temperature, the faster this product will work. The effective operating range is between 42 F & 120 F (6 C – 50 C).

Type of Hydrocarbon: Some hydrocarbons take longer than others. It has been our experience that the "cleaning" action of this process begins immediately. The bio-remedial process will begin almost immediately but may take longer to complete depending on age of stain or surface type.

Performance Tips: For stains that are aged by time or prolonged sunlight, allow product to soak and scrub the area with a coarse brush and/or pressure wash. Old stains may require multiple treatments.

Shelf Life: Properly stored unopened containers have a shelf life of 2 years, 1 year after opening.

For more information Contact:



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