

# **BioWorld Products**

**California • USA • Worldwide**

## **Oil Spill Cleanup Projects Summary**

# BioWorld Products

California • USA • Worldwide

## Bioremediation Technology

### BioWorld Advantages

- Sophisticated technology – easy to use
- Effective-fast cleanup versus natural attenuation
- Environmentally safe and natural treatment
- Easy to apply - no protective clothing required
- Low cost efficient methods
- Long-term solution for balanced ecosystem

### What It Is

- BioWorld combines Bioenhancement and Bioaugmentation for effective Bioremediation processes
- BioWorld Bioenhancement: a biotech formulation of liquid compounds, vitamins, and minerals which maximize the ability of microbes to reproduce and thrive in the contaminated area
- BioWorld Augmentation: A group of specific microorganisms selected for each type of contaminant
- Note: It is not how many microorganisms that are applied which is important, it is how many reproduce in the contaminated area. BioWorld Bioenhancement makes this happen.

### What It Does

- BioWorld Technology creates a situation where microorganisms directly metabolize contaminants and/or create enzymes for efficient conversion of contaminants
- Contaminants are converted to water, simple gases such as CO<sub>2</sub>, proteins, fatty acids, elemental forms and other non-polluting substances

### Where to use

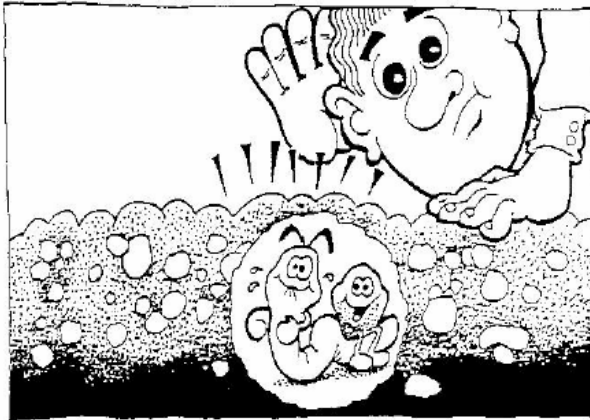
- Oil spills, weathered oil, tanks, drilling sites, refineries, ships
- BioWorld technology for saltwater, freshwater, soil, sand, wood, metal, concrete
- BioWorld formulations are available for: Crude, processed or refined oils, gasoline, diesel, Bunker C, fuel oil, heating oils, benzene, kerosene, surfactants, amines, alcohols, esters, glycols, ketones, BTXE's, naphthalenes, phenols, aromatic and other hydrocarbons



# BioWorld Bioremediation

Proper Nutrients and Microorganisms  
Have Big Impact on Waste Cleanup

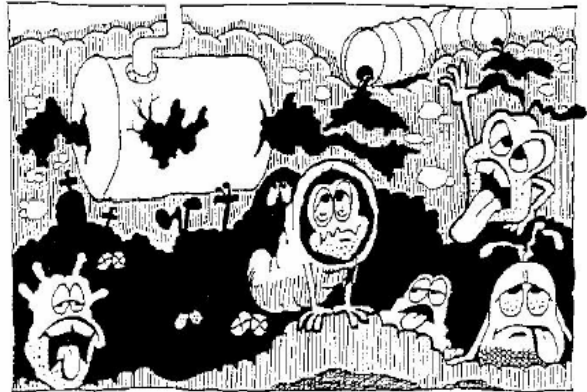
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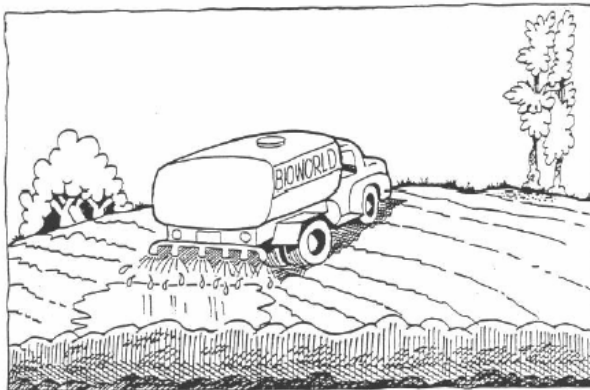
Native soil have many types of tiny creatures called microbes.

2

When hazardous wastes contaminate the soil, the existing microbes struggle to survive. Strains known to be efficient at degrading the waste may or may not be present. In addition, the microbes generally lack the proper nutrients to reproduce and thrive.



3



Using BioWorld Bioremediation Technology, the proper strains of selected microbes and soluble forms of the necessary nutrients are easily applied to the waste situation.

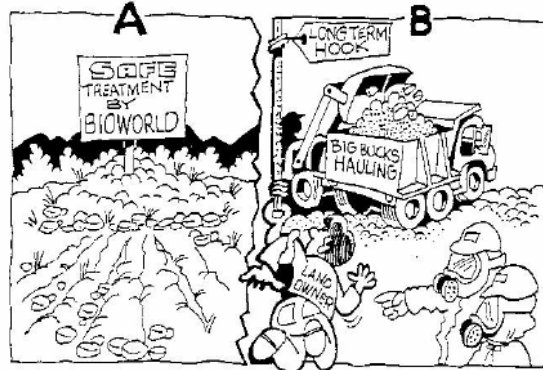
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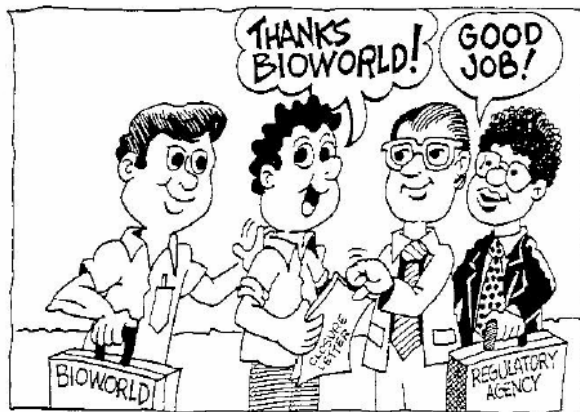
Billions of healthy microbes constantly work to break down hazardous waste into harmless by-products

5

- A BioWorld provides an efficient, environmentally safe, on-site treatment solution to many hazardous waste cleanups.
- B Long-term liability from off-site transport and disposal is completely eliminated.



6



The result is a successful, cost-effective cleanup in compliance with environmental regulations.

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## COMPANY PROFILE

Founded in 1991, BioWorld Products LLC uses leading edge biotechnology and engineering to create progressive and economical products for improving soils and crops, and solving numerous environmental problems. The company had a goal to design and manufacture extremely sophisticated products that are safe and easy to use, yet very effective in getting the job done.

The company began by working closely with Advanced BioTech of California to manufacture several specialized – innovative products in concentrated forms that would get real-world results. The development of MultiFIX™ Soil, Plant and Crop Enhancer was the flagship product and the basis for many of the BioWorld formulations. MultiFIX™ is a specially formulated liquid which provides the proper compounds required by soil microbes and plants. The soil comes alive with trillions of beneficial microbes which work to adjust pH, make nutrients more available, improve plant health, and increase crop quality and yields. Many satisfied growers include MultiFIX™ with their existing fertility programs.



Later in 1991, the company expanded into waste and odor treatment products and began marketing in the United States. Other products were developed for solving environmental problems including odor control, algae control, wastewater treatment and initial development of the hydrocarbon cleanup technology.

Part of the BioWorld technology for Waste and Odor Treatment uses a combination of bioenhancement compounds and mature strains of selected microorganisms to break down most wastes into environmentally safe compounds. The “Real Keys” to our technology over the competitors are the bioenhancement formulations we have developed using biotechnology. These formulations maximize the ability of the microbes to reproduce and thrive, allowing them to adapt to the waste environment. Our waste and odor treatment technology has been successfully applied to wastewater containing grease, fats, manure and other simple organic matter, municipal and industrial wastewater containing sludge and high BOD, TSS and also unique algae control in ponds on golf courses, farms and ranches. Industries utilizing our products include government facilities, food processors, rendering facilities, dairies, universities, municipal wastewater facilities, office complexes, storage buildings, golf courses, hotels, restaurants and homeowners.



One of the considerations for expanding our marketing program on an International scale was the use of the internet. Advanced BioTech and BioWorld Products were among the first private firms to have an operating website in 1994. A primary advantage of the website was to present, market and communicate effectively with our international clients and prospects via the [www.adbio.com](http://www.adbio.com) site.

Many of our clients had environmental problems that needed innovative, cost effective solutions. This created a demand for BioWorld to develop a specialized bioremediation technology, which was added to its range of services/products in 1994. BioWorld Bioremediation technology has proven to be a non-disruptive, cost-effective, and highly efficient method of safely breaking down many environmentally persistent toxic chemicals. The company specializes in bioaugmentation which includes applying the proper bioenhancement compounds in conjunction with mature strains of hydrocarbon degrading microorganisms to a contaminated situation. The result is a faster and more complete degradation of the contaminant that can be accomplished on site. To date, our products and technology have been used to cleanup petroleum hydrocarbons such as crude oil, gasoline, Bunker "C" fuel oil, diesel, MTBE, and other petrochemicals.



The development of BON – BioWorld Odor Neutralizer – in 1995 has proven to be a terrific addition to the product line. The formulations were developed for the specific purpose of direct odor control and were created using a completely different technology than the bioenhancement formulations. BON is a true odor neutralizer that is primarily used in large industrial type applications. BON has also gained acceptance with homeowners for residential uses.



Many of our projects in the United States are completed by using the BioWorld staff on site and in association with engineering firms, consultants, and contractors. Most of the BioWorld managers and scientists have been in the field during projects and have gained first hand knowledge of product applications and product performance. This experience allows us to assist our international clients with projects through phone calls, e-mails and other communications. Simple application instructions are provided to our clients with each product shipment. The cost savings to our international clients can be substantial versus the expenses of our staff traveling to the individual project site in other countries. BioWorld has also developed specialized methods and equipment to provide easy application of the BioWorld products in certain situations. We have designed our technology, products and equipment to perform in "Real World" larger scale projects – not small scale lab experiments.



The company has received international exposure through various resources including the U.S. Department of Commerce, the U.S. Asia-Environmental Partnership, the California Trade and Commerce Agency, newspapers, magazines, and the California Environmental Protection Agency. Our worldwide presence extends across the globe with our products and technology being purchased or evaluated in numerous countries by government and private firms. As a result, the company is currently working in over 50 countries.



Since the company is a pioneer in new specialized biotechnology, each project success provides another building block in company growth. Distribution is accomplished through large and small firms around the globe including independent agents, distributors, fertilizer dealers and engineering firms that are interested in only the "The Best" for their clients. The worldwide potential for our technology appears to be unlimited as we strive to continually improve what we do! In fact, BioWorld has been honored with numerous business awards and published in magazines and newspapers for their accomplishments.

BioWorld Products is in compliance with United States Federal, State of California, ISO14001 and local agencies for health, safety and environmental regulations. BioWorld Products LLC continues to create a better world through new biotechnology, WORLDWIDE.



## The Science and Research Behind BioWorld Technology



Combining several technologies allows BioWorld to Produce “State of the Art products.”



Evaluating liquid bioenhancement technology – the substrate formulations which make BioWorld the best products commercially available.



BioWorld Bioenhancement formulations are very clean products

The product formulations are developed to be safe and easy to use.

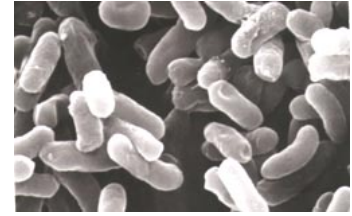


Large scale production of the Liquid Bioenhancement Products.





BioWorld Bioaugmentation  
Microbes are evaluated and selected for specific degradation capabilities.



The microbes for oil spill cleanup are selected and propagated.



BioWorld Microbes are grown and dried for easy storage, long shelf life and safe handling.



# **BioWorld Products**

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- *BioWorld Bioremediation Technology*
  - Many hydrocarbons can be safely remediated
  - Oil Spills
  - Water, sand, rock, soil

For Oil Spills on water, beach and shoreline.

BioWorld Products can be safely and easily applied as follows:

Use ship, boat or aircraft for water surface application.  
Use aircraft, tractor, truck or small sprayers for land.

Per hectare of water surface, beach or shoreline  
BioWorld Bioremediation Enhancer  
50 to 400 Liters or more for faster results  
BioWorld Hydrocarbon Degrading Microbes  
500 grams to 5 Kilograms or more for faster results

Repeat application as situation dictates – such as every 7 to 30 days on shoreline or water surface.

Treat area around ship leak to degrade oil and help prevent oil from reaching the shore.

Advantages – BioWorld Oil Spill Cleanup Technology is safer and will cost less than other technologies.

The first line of defense is to use skimmer equipment and save the oil if possible. Weather conditions and time may change this plan.

Caution with other chemicals and materials...

1. Dispersants and other chemicals can cause more damage to the environment than the oil. When the oil sinks, it affects the fish, crustacean and wildlife below the surface of the water

2. Absorbent materials can cause disposal issues and can be unsafe for workers to handle.

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**www.adbio.com**  
**559.651.2042**  
**Visalia California USA**

BioWorld Bioremediation Oil Spill Cleanup Technology can be safely and easily applied by aircraft, tractor, ship or small sprayer systems.

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## Bunker "C" Fuel Oil Bioremediation Project



Old wooden fuel storage tanks were excavated and the contaminated soil was spread over a 4 acre area by parcels – 1 foot deep totaling 6,000 cubic yards. Initial TPH was 4,000 ppm.



BioWorld Hydrocarbon Degrading Microbes were activated prior to application – then added to water truck.



Technicians added BioWorld Bioremediation Enhancement Products to a 4,000 gallon water truck.



Water and the BioWorld Technology were applied to the contaminated soil.



The soil was disked for mixing and aeration.



Cleanup TPH was 100 PRM. The soil is covered with native plant life and could be safely used for cropland.

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### **Expected Results Using BioWorld Technology**

The goals of using the BioWorld Bioremediation Technology

- Restore the water, beaches, rocks, marshes, coves and other shoreline areas to the condition prior to the oil spill.
- Restore the shoreline in a number of months – not 5 to 10 years.
- Provide safe products that are clean and simple.
- Provide products that cost less than other treatment methods.



### **Advantages of using BioWorld Technology over other Methods**

Some organizations will use basic fertilizer such as nitrogen and consider this type of treatment bioremediation. The BioWorld Bioenhancement Products are a combination of sophisticated and complex formulations that supply the microbes with a balance of nutrients. The microbes then have the resources required for rapid reproduction and expanded populations in the contaminated areas.

More information available upon request.

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## BioWorld Bioremediation Treatment

BioWorld Bioremediation Treatment uses a unique combination of bioenhancement compounds and mature strains of selected, naturally occurring microorganisms for the bioremediation of petrochemical wastes. The special Bioremediation Enhancer formulation maximizes the ability of the microbes to reproduce and thrive in the waste system. Hydrocarbon Digesting Microbes consist of various microbial strains and biochemical nutrients for refinery and petrochemical wastes.

### Bioremediation Enhancer

- #75014—1 gallon Bioremediation Enhancer
- #75064—6-gallons Bioremediation Enhancer
- #75250—250-gallons Bioremediation Enhancer

### Hydrocarbon Digesting Microbes

- #32086—½-pound Hydrocarbon Digesting Microbes
- #32055—2½-pounds Hydrocarbon Digesting Microbes

### Small Project Combination

- #82186—Hydrocarbon Treatment Unit  
(Includes 1-gallon Bioremediation Enhancer & ½-pound Hydrocarbon Digesting Microbes)



### ***Composition and Physical Properties***

Liquid: Bioenhancement Compounds, Vitamins, Minerals, Amino Acids, Polysaccharides, Esters, Alcohols, Oils, Proteins, Organic Acids, Natural Liquid Enzymes, Organic Surfactants

- pH: 5.5 – 6.5
- Boiling Point: 212°F/100°C
- Freezing Point: 32°F / 0°C
- Solubility in Water: 100%
- Specific Gravity: 1.0028
- Appearance & Odor: Blue; Floral Scent

Dry: Selected strains, natural enzymes on a bran carrier

- Concentration: Maximum viable CFU/gram, strain and type dependant
- Form: Free Flowing Powder
- Color: Light Brown
- Odor: Yeast Like
- pH: Neutral
- Effective pH Range: 5 – 9
- Effective Temperature Range: 50 – 110°F

**For additional information, please contact your distributor or BioWorld Products.**

# BioWorld Products

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For Oil Spill Cleanup

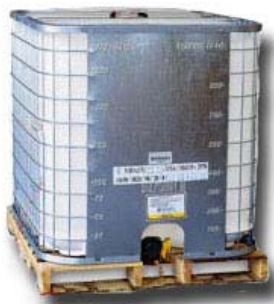
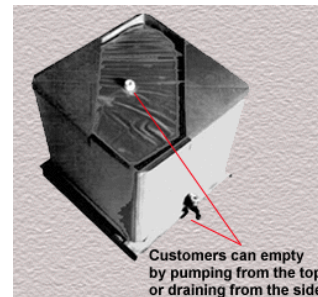
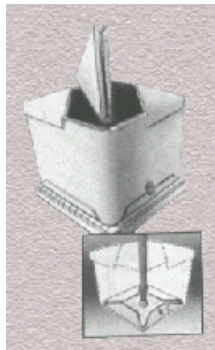


- Product #75250 BioWorld Bioremediation Enhancer - 250 gal/950 L
- Product #32055 BioWorld Hydrocarbon Degrading Microbes - Bulk

HARMONIZED TARIFF PRODUCT	SCHEDULE B NO. & HEADINGS	CHK DGT
Natural Microorganisms (All)-Dry (General Blend, Algae, Hydrocarbon)	3507.90.90 or 3401.20.10.00	9
BioWorld Liquid Optimizer - Waste & Odor Treatment	3823.90.90 or 3402.90.90.90	10



- Completely recyclable, biodegradable and waste-to-energy efficient.
- 1,000-Liter Export Container for Non-Hazardous Liquids on wood pallett
  - Inner multi-ply film liner in a corrugated cassette, cap, and PE shroud.



- Steel Cage Container

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**COMPLETE\***  
**WASTE & ODOR TREATMENT**

**MICROBES**

\* When used with BioWorld Liquid Optimizer  
Environmentally Safe • Naturally Occurring Strains

General Blend                       Composting  
 Algae Competitors                 Hydrocarbon Digesters  
 Crop/Soil Enhancers                 Other \_\_\_\_\_

**Caution:** Do not eat. Avoid contact with skin and inhalation of dust.  
Store above 33°F (1°C) and below 110°F (43°C).

Net Weight  1/2 Pound, 227 Grams    2 1/2 Lbs., 1.1 Kg

**BioWorld Products**  
PO Box 2920 • Visalia CA 93279-2920 USA  
209-651-2042 or 559-651-2042  
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**INTERNATIONAL USE FOR:**

Agricultural Waste • Dairy Lagoons • Restaurants and Hotels • Hog and Poultry Operations • Government Facilities • Industrial Plants • Food Processing Facilities • Golf Course and Park Ponds • Rivers • Irrigation Systems • Aquaculture • Ship Bilges • Grease Traps and Lift Stations • Porta Potty • Septic Tanks and Cesspools • Slaughter/Rendering Facilities • Bioremediation • Compost • Crop Residue • Mining Land Reclamation • Drain and Line Cleaning • and Others

Biotechnology makes it possible to overcome a host of environmental challenges by using bioremediation and degradation accelerators.

- Odors
- Wastewater containing grease, fats, manure, sugars, starches and other simple organic matter
- Municipal and Industrial Wastewater containing sludge, high BOD and TSS
- Algae treatment in lakes and ponds
- Petroleum Hydrocarbons (Oil spills and storage tank areas)
- Wood Wastes / Cellulose
- Pesticides
- Compost
- And many others

BioWorld Water, Waste & Odor Treatment uses a unique formulation of liquid compounds and selected strains of mature, naturally occurring microorganisms (in separate unit). BioWorld breaks down waste into environmentally safe materials while reducing odors in the process.

**WATER, WASTE & ODOR TREATMENT\***



**Liquid Optimizer Plus Odor Neutralizer**

Environmentally Safe • 100% Natural  
Unique Biotechnology Formulation

Formula for:

- Simply the Best**
- Organic Waste                       Odor Reduction (neutralization)  
 Algae Treatment                     Agricultural Use Fertilizer  
 Composting  
 Bioremediation

Contents:

- 1 gal / 3.8 liters  
 5 gal / 19 liters  
 6 gal / 22.8 liters  
 250 gal / 950 liters

\*When Used with BioWorld Selected Microbes.  
(Available in Separate Unit)  
Rev. 06/98 © Copyright BWP 1998 (ISA 4031)

**DESCRIPTION:**

Primary ingredients and microbial enhancers are derived from safe and natural biotechnology processing, which produces soluble liquid compounds essential for microorganisms to reproduce and thrive. All natural ingredients include: chelated vitamins, minerals, amino acids, peptones, peptides, polysaccharides, esters, alcohols, oils, fats, proteins, enzymes, organic acids, EDTA, iron, zinc, copper, manganese, magnesium, molybdenum, ammonium phosphate, urea, potassium nitrate, white phosphoric acid, with ammonium laureth sulfate, organic surfactants, odor neutralizing agents and other compounds.

**CAUTION:**  
**Keep Out of Reach of Children.**  
**Do Not Eat or Drink.**

**TRANSPORTATION SPILLAGE INFORMATION:**

Product Identification: BioWorld Liquid Optimizer Plus Odor Neutralizer is a non-hazardous material, light blue in color, with a mild fragrance. Safe Disposal Method: May be safely applied on cropland, highway landscape, golf courses at 2,500 gallons per acre (4,000 liters per hectare) or may be added into sewage or drain lines (the product is designed to benefit sewage treatment systems). Open land/desert at 2,500 – 5,000 gallons per acre (4,000 – 8,000 liters per hectare).

**BioWorld Products**  
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# **BioWorld Products**

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## *Contact Information*

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Monday - Friday