# Presentation Agenda

PINKWATER
HYDROCARBON MITIGATION AGENT™

- Features & Benefits
- Technical Overview
  - The Science
- Product Applications
  - Tank Cleaning
  - Soil Remediation
  - Vapor Suppression
  - Emergency Spill Response
  - Equipment Decontamination
- Summary

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PINKWATER™
HYDROCARBON MITIGATION AGENT

# What is PINKWATER?

PINKWATER is a highly concentrated, water-based, non-ionic surfactant package designed to mitigate hydrocarbon contamination.



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# Cost Benefits

## PINKWATER products save money, simplify operations

- Improves worker safety
- Versatile product; solves many problems
- SAVES MONEY! Very low treatment cost
- Lowers inventory cost
- SAVES TIME! Works rapidly
- Reduces disposal cost
- Made in America and proven worldwide
- Long shelf life; >10 years!

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# Features & Benefits

- Easy to use
- Safe / Friendly for workers and the environment
  - Water-Based
  - No Caustic or D-Limonene
  - pH 9
  - Biodegradable
- Proven effective in light concentrations
- Time savings of 60%
- The emulsion can be broken to recover oil
- Makes fuel spills non-flammable reducing fire and explosive hazards
- Disperses fuel spills on water
- Reduces LEL's for confined space entry
- Suppresses VOC's & odors at excavation sites
- Enables extraction of hydrocarbons from soil

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# Common Uses

- Tank cleaning
- Suppression of volatile organic vapors
- In-Situ remediation of contaminated soil / oil-based mud cuttings
- Hazardous spill containment and cleanup
- Solubilization of sludge and grease (Degreaser)
- Oil / Fuel storage tank cleaning and degassing
- Equipment and hard surface decontamination
- Paraffin control in oil wells

Features & Benefits

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# How does PINKWATER work?

- PINKWATER is engineered to aggressively “grab” hydrocarbon molecules and hold (suspend) them in an emulsion.
- With agitation, hydrocarbons are pulled away from hard surfaces
  - Metal
  - Concrete
  - Asphalt
  - Soil
- Agitation can be provided by pressure-washer, pump, brush, hose, manway cannons, sprayer.
- The emulsion is non-volatile, readily degraded and prepared for accelerated biodegradation/bioremediation

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# How does PINKWATER help?

- PINKWATER aggressively “grabs hydrocarbon molecules and holds them in a water-based solution, called an emulsion
- This emulsion includes all of the oil plus a little water and most of the PINKWATER
- **This means water can be used to cleanup oil!**

EMULSION



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# The Science



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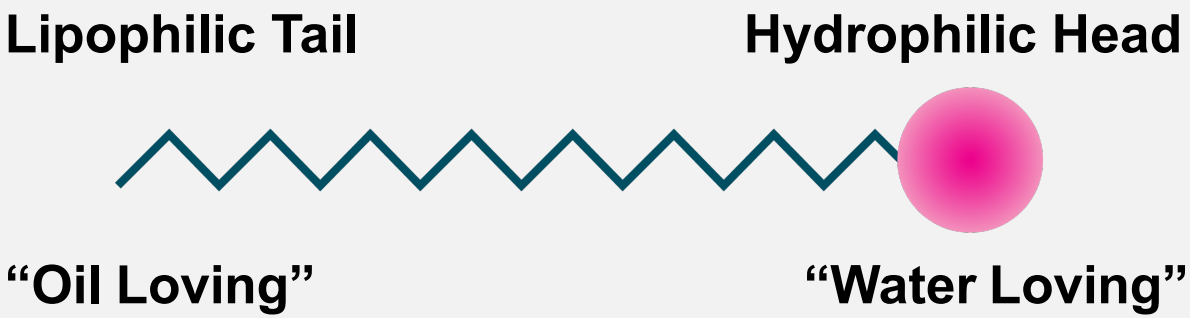
# What are Surfactants?

## **Surfactant** = **SURF**ace **ACT**ive **A**ge**NT**

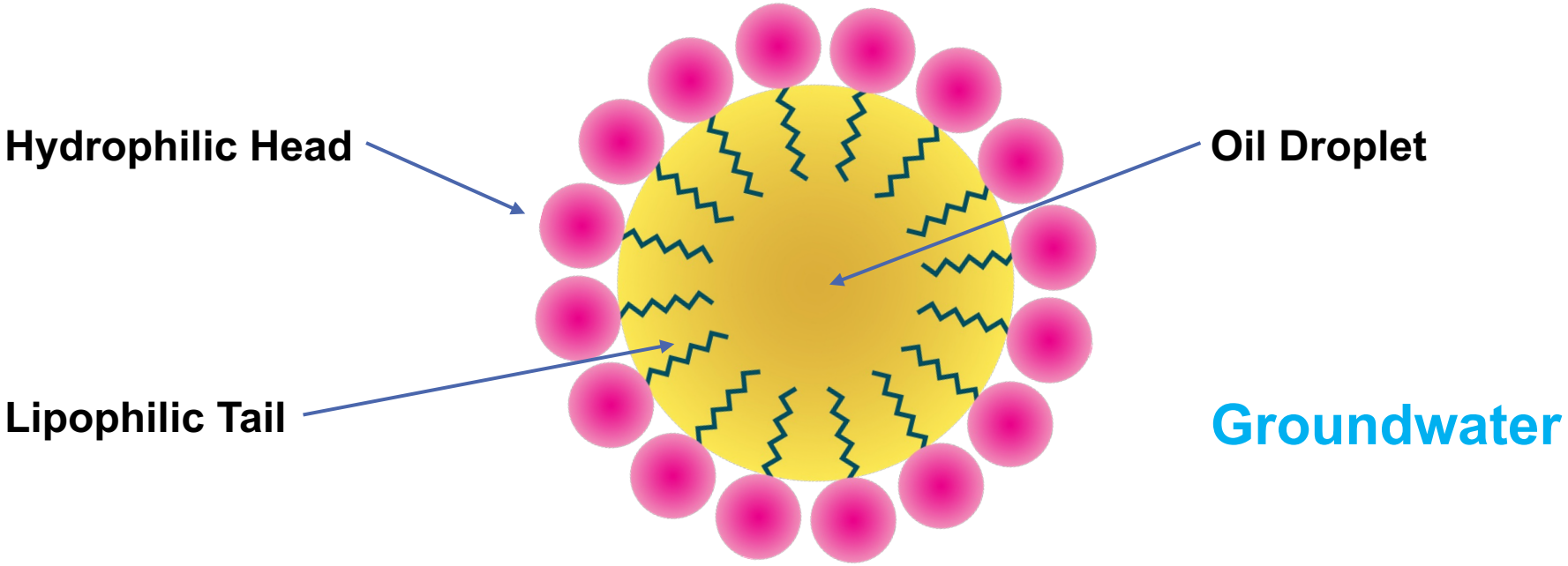
Surfactants change the behavior of liquids at the surface.

**Surfactant Molecule**



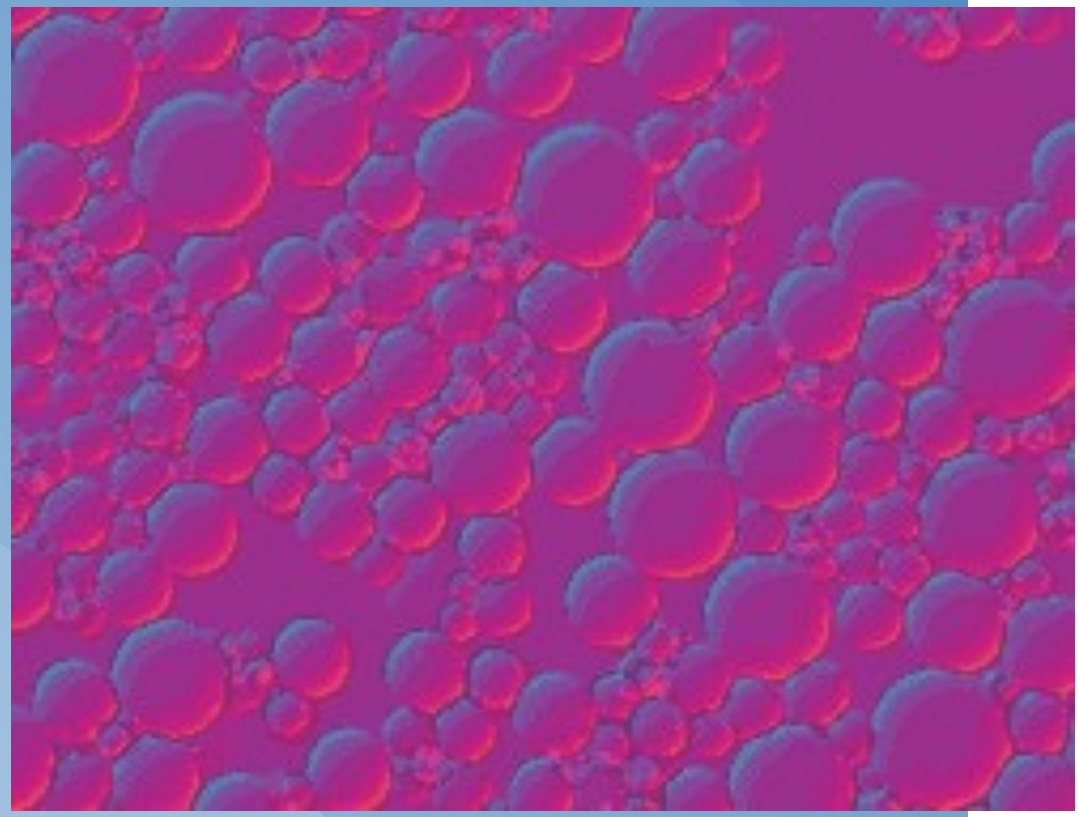
# What are Surfactants?

Surfactants reduce interfacial tension between oil and water to encapsulate and ***emulsify*** oil




Under the right conditions, some surfactants will form a ***micellar emulsion***

# What are Surfactants?



These micro-encapsulated oil droplets are called ***micelles***

**PICTURED:**

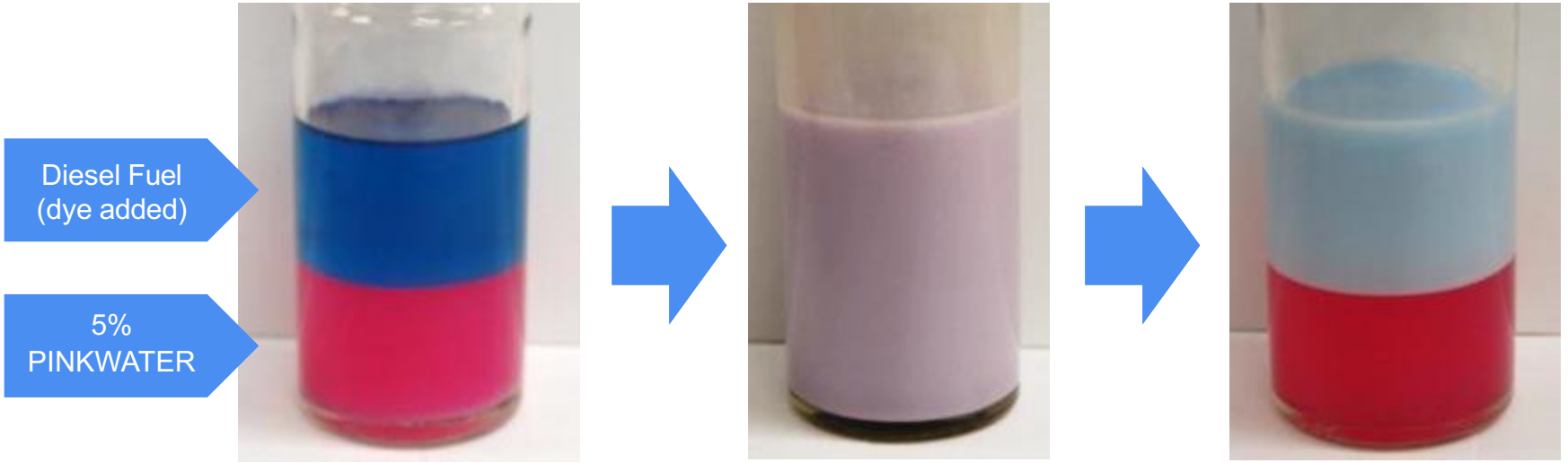
Microphotograph of surfactant micelles (45µm x 65µm); dye added to enhance resolution

# Emulsions with PINKWATER

## PINKWATER creates very stable emulsions.

Creating an emulsion requires the addition of *mechanical energy (agitation)* through stirring, pumping, spraying, brushing or other means.

**Diesel and PINKWATER Solution**




**Before Agitation**

**Immediately after Agitation**

**30 minutes after Agitation**

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# PINKWATER emulsifies a wide range of Hydrocarbons

## Very Effective On:

- Gasoline
- Diesel Fuel
- Heating Oil
- Jet Fuel/Kerosene
- BTEX
- PCE/TCE
- Light crude oil
- Natural Gas Condensate
- Creosote
- Light oils
- Mineral Spirits
- Turpentine
- Hydraulic Fluid
- *and others…*

## Will Not Work On:

- Lower alcohols (Methanol, ethanol, isopropyl alcohol)
- Most acids and alkalis
- Ammonia and ammonia compounds
- Nitrates, sulfates
- Ethylene glycol
- *Other water soluble products*

## Will with Extra Effort:*

- Motor oils
- #4 - #6 Heating Oil
- Medium to Heavy Crude Oil
- Palm Oil, Corn Oil
- Linseed Oil
- Paraffin
- Bitumen (tar)
- *Other heavy, viscous or weathered products*

**Extra Effort may include, for example, additional agitation, pressure or mixing; circulation system to allow extended contact; the use of a cosolvent or hot water to reduce viscosity*

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# PINKWATER Recap

- Lipophilic formulation; effectively removes oil from soil and all hard surfaces
  - Leaves no residue on hard surfaces
- Optimized for fuel-range hydrocarbons
- Reduces volatility and hence flammability
- Work at low concentrations
- Emulsions are very stable; emulsions can be broken to recover oil
- Knocks down vapors and odors on contact
- Water-based, non-hazardous, no caustic or solvents
- Will emulsify 20 times its volume of hydrocarbons

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# Product Applications

- Tank Cleaning and Degassing
- Soil Remediation
- Equipment Decontamination / Cleaning
- Vapor Suppression & Odor Control
- Emergency Spill Response



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Product Applications

TANK CLEANING

# Tank Cleaning & Degassing

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PINKWATER is a standard component in cleaning/degassing protocols for oil and fuel tanks of all sizes. High pressure spray application of PINKWATER solution to tank walls and internal structures rapidly reduces LEL (Lower Explosive Limits) readings, improves worker safety, and sharply reduces project turnaround time. PINKWATER solution is also sprayed/mixed into sludge to knock down vapor levels and convert sludge into a pumpable aqueous solution.

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Product Applications

TANK CLEANING

PINKWATER™
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## Features & Benefits

# Advantages of Tank Cleaning with PINKWATER

- Cost savings
- Safe, efficient working conditions
  - NO hazardous chemicals
- Promotes lower disposal costs
- Quick turnaround
  - Decontaminates and reduces LELs in a single application
- Makes sludge non-hazardous

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Product Applications

TANK CLEANING

# Tank Cleaning & Degassing

Cleaning and maintaining oil and gas storage tanks are critical procedures to ensure safety, efficiency, and regulatory compliance. These tanks, whether used for crude oil, refined products, or liquefied natural gas (LNG), require routine inspections, cleaning, and maintenance to prevent corrosion, contamination, and other issues that can affect their performance.



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## Tank Cleaning Applications

- Final Cleaning and Degassing
- Cleaning & Degassing under the Tank
- Sludge Cleaning
- Gas Scrubbing
- Offshore Platform Pressure Vessels

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# Final Cleaning & Degassing

- PINKWATER is is best known for for its effectiveness in degassing tanks containing volatile products, such as gasoline.
- PINKWATER reduces time to degas by over 60%
- PINKWATER strips and emulsifies hydrocarbons on contact.
- For tanks used to store light products, with little or no residual sludge, a single application of PINKWATER will clean and degas the tank reducing LEL readings to near zero in preparation for manned entry.
- PINKWATER may also help control hydrogen sulfide levels (H2S) in the tank.
    - Compatible with commercial water-soluble H2S Scavenger products.

# Cleaning & Degassing Under the Tank

Occasionally a leak in the tank bottom may become a source of hydrocarbon vapors that keep LELs “over-the-limit” for hot work or even manned entry.

- PINKWATER can be injected into the ground under the tank to emulsify hydrocarbons and suppress vapors.
- This will eliminate the source of the vapors and reduce the LELs to safe levels

# Sludge Cleaning

- PINKWATER can be added to avoid the cost of transporting and disposing of the sludge from the bottom of the tank.
- After circulating the sludge mixture, it might be necessary to add water or a cutter stock to achieve a pumpable mixture.
- After adding PINKWATER, the aqueous solution needs to be thoroughly and aggressively mixed using either internal mixers or an external circulation loop.
- Once the circulation is stopped, the emulsion will separate
  - Clean solids will be located at the bottom
  - An aqueous layer in the middle
  - An emulsion layer at the top that will contain 99% of the hydrocarbons.

## The Results

- Emulsion layer can be skimmed off and treated as hazardous waste
- Aqueous layer can be sent to a wastewater treatment facility
- Solids can be tested and used as clean fill

# Gas Scrubbing

- PINKWATER has been proven effective in gas scrubbing systems for removing hydrocarbon vapors from tanks as well as refinery and chemical plant process sewers.
- The vapor or process gas is passes through a gas scrubber column using PINKWATER as the working fluid to “capture and solubilize the hydrocarbons in the gas.
- Over time, VOC monitors will indicate when the PINKWATER has become saturated and a new charge is required.
- As discussed, PINKWATER can be mixed with a water-soluble scavenger product for controlling other gasses such as H2S.

# Offshore Platform Pressure Vessels

PINKWATER can be used on offshore oil platforms to decontaminate and degas pressure vessels prior to inspection.

- Drain the tanks
- 6% Solution or PINKWATER is sprayed at 3,000psi to suppress the vapors and perform initial cleaning.
- Once the LELs are lowered, the tank is opened and vented.
- Final cleaning and desludging continues using the same 6% PINKWATER solution.
- Final Inspection
- The tank is quickly returned to service

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# Tank Cleaning Best Practices

Cleaning and maintaining oil and gas storage tanks are critical procedures to ensure safety, efficiency, and regulatory compliance. These tanks, whether used for crude oil, refined products, or liquefied natural gas (LNG), require routine inspections, cleaning, and maintenance to prevent corrosion, contamination, and other issues that can affect their performance. Below is a general procedure for cleaning and oil and gas storage tanks:

## Cleaning the Tank

Cleaning methods depend on the type of residue and contaminants, but common cleaning method to prepare for manned entry is:

**Sludge Removal and Reclamation:** For use on viscous or compacted sludge, or for use in tanks with a large accumulation of sludge (up to a foot or more), a system for mixing **PINKWATER** into the sludge may be required to create a pumpable effluent. In some cases, mixing **PINKWATER** with hot water and/or supplementing a **PINKWATER** application with steam may be beneficial. As conditions allow, hydrocarbon-laden effluent from the tank may be circulated through an oil/water separator (or “frac tank”) to capture emulsified hydrocarbons for disposal. The residual aqueous phase, **PINKWATER** solution, may be recycled after inspecting and adjusting the solution (e.g., spiking with additional **PINKWATER** concentrate) to maintain its effectiveness. Solids should fall out of solution during the separation process. Alternatively, the **PINKWATER** solution may be batch processed, repeatedly circulating the solution through the tank until it is “oil bound,” then pumping to a frac tank for separation. The remaining sludge is typically disposed of in accordance with environmental guidelines.

# Tank Cleaning Best Practices (continued)

**Chemical Cleaning: PINKWATER** concentrate is mixed with water to prepare a 6% working solution. As a guideline, plan for 1 gallon of **PINKWATER** concentrate for each 10 – 20 gallons of residual hydrocarbons in the tank. **PINKWATER** solution is generally applied using an automated pressure washing system (such as a water cannon or rotary impingement equipment, such as a Gamajet®) to loosen and solubilize sludge and to clean tank walls, roof and internal structures. Using **PINKWATER** may also help control hydrogen sulfide levels and can be used with many commercial hydrogen sulfide scavenger products. However, always test compatibility before using

**Manned Entry:** Once the vessel is in a condition to allow for manned entry, personnel may be deployed inside the tank to: Power wash paraffins and other contaminants from the walls and interior structures, Perform required maintenance.

**Scraping & Brushing:** For smaller tanks or localized contamination, personnel can use manual tools like scrapers and wire brushes to remove sludge, residue, and deposits.

**Drying:** After cleaning, the tank should be thoroughly dried, especially if water or chemical solutions were used. This may involve air drying or using dryers if available.

# Tank Cleaning Best Practices

**Cleaning the Tank**
Cleaning methods depend on the type of residue and contaminants, but common cleaning method to prepare for manned entry is:

**Sludge Removal and Reclamation:**
For viscous or compacted sludge in the tank (e.g., up to a foot or more).

**Procedures:**

- **PINKWATER Mixing:** PINKWATER 6% solution is mixed into the sludge to create a pumpable effluent. The sludge is often treated with hot water or steam to improve the solubility and ease of removal.
- **Oil/Water Separation:** If the sludge contains hydrocarbons, the effluent is passed through an oil/water separator (or frac tank) to capture the emulsified hydrocarbons for disposal. This step helps in recycling the aqueous phase of the solution, reducing waste.
- **Recycling the PINKWATER:** After separation, the remaining solution can be reused, potentially with additional PINKWATER concentrate added to maintain its cleaning power.
- **Batch Processing:** In some cases, the solution is circulated through the tank repeatedly until it binds with the oil. The solution is then pumped out to the frac tank for separation. Residual sludge is disposed of following environmental regulations.

# Tank Cleaning Best Practices (continued)

**Manned Entry:**

- **Purpose:** To clean hard-to-reach areas and perform maintenance that requires human intervention.
- **Preparation:** Once the tank is sufficiently cleaned (through sludge removal and chemical cleaning), it is deemed safe for manned entry. Personnel enter the tank to perform tasks such as:
  - Power washing paraffins and other residues from walls and structures.
  - Carrying out necessary maintenance tasks, such as repairs or inspections.

**Scraping & Brushing:**

- For smaller tanks or localized contamination, manual tools are employed.
  - **Manual Cleaning:** Scrapers and wire brushes are used by personnel to physically remove sludge, residue, and deposits. This is typically done in areas where automated cleaning methods are not effective or practical.

# Tank Cleaning Best Practices (continued)

**Drying:**

- **Purpose:** To remove any moisture left from cleaning processes, ensuring the tank is dry and safe for further use.
- **Procedure:**
  - **Air Drying:** After chemical or water-based cleaning, air drying is often employed to eliminate any remaining moisture.
  - **Mechanical Drying:** If available, industrial dryers may be used to speed up the drying process, especially in larger tanks or where moisture could lead to corrosion or other issues.

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# Typical Tank and Pipeline Cleaning Projects using PINKWATER

- Sludge removal and degassing of oilfield (crude) collection tanks
- Removing p-xylene from interstitial space under tank at petrochemical plant
- Cleaning and degassing a crude sulfate turpentine tank and pipelines at pulp mill
- Decontaminating and decommissioned gasoline pipeline at fuel terminals
- Degassing an acrylonitrile tank for manned entry at a petrochemical plant
- Removing sludge and degassing a sour water tank at a crude oil processing plant
- Final cleaning and degassing of gasoline tanks
- Scheduled cleaning and sludge decontamination of pressure vessels on offshore platform
- High volume scrubbing of refinery process sewer gas
- Degassing a distillate tank at refinery

Product Applications

SOIL REMEDIATION

# Hydrocarbon Bioremediation

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PINKWATER is used in Soil Bioremediation or soil washing to remove hydrocarbons. The ability to micro-emulsify hydrocarbons results in enhanced bioavailability for naturally occurring hydrocarbon-eating bacteria. This dramatically accelerates the biodegradation process removing the hydrocarbons from the environment.

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# 100 Years of Drilling for and Producing Oil has Left a Legacy of Contaminated Sites Around the World

| | Action | Issue |
|---|---|---|
| **Primary Response** | Abandon in place | Problem spreads creating health and environmental risk |
| **Secondary Response** | Excavation | Huge volume of soil; not enough landfill space; expensive |
| **Tertiary Response** | Physiochemical treatment | Complicated, expensive, long remediation time |
| **Modern approach** | Bioremediation | Use native bacteria to degrade Oily waste |

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# There are Two Forms of Bioremediation for Treating Contaminated Soil

**In-Situ**
Treat in Place

**Ex-Situ**
Remove and Treat

Landfarming is the most common form of ex-situ bioremediation for treating contaminated soil



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# Advantages & Disadvantages Soil Remediation

## Advantages

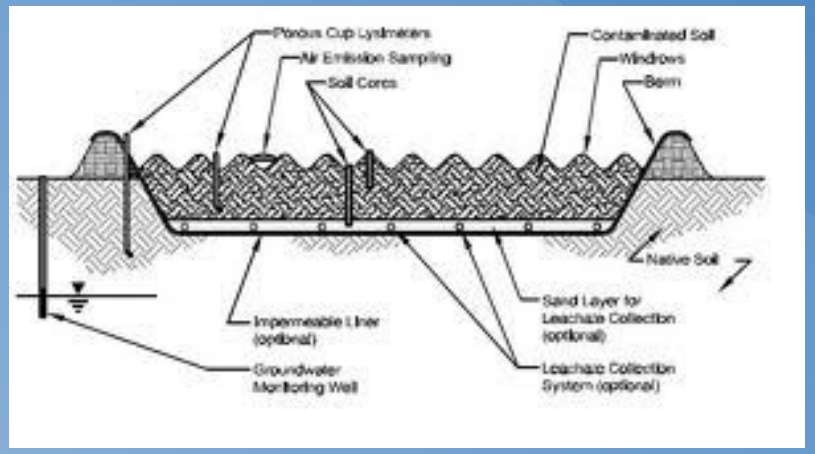
- Simple to design and implement.
- Short treatment times (< 6 months).
- Cost effective.
- Effective on wide range of contaminants.

## Disadvantages

- Difficult to achieve >95% reduction in contaminants.
- Less effective on contaminant concentrations >50,000 ppm.
- Requires “tending” to achieve optimal performance.
- Requires large land area and soils with good organic matter.
- Only suitable in moderate to warm climates.

Product Applications

SOIL REMEDIATION





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# Soil Bioremediation is sensitive to environmental conditions

## Rate Determining Factors

- Soil Nutrients (Nitrogen & Phosphorus)
- pH
- Moisture
- Salinity
- Oxygen
- Temperature
- Type and concentration of contaminant
- Availability of hydrocarbons to bacteria
- Hydrocarbon degrader bacteria population

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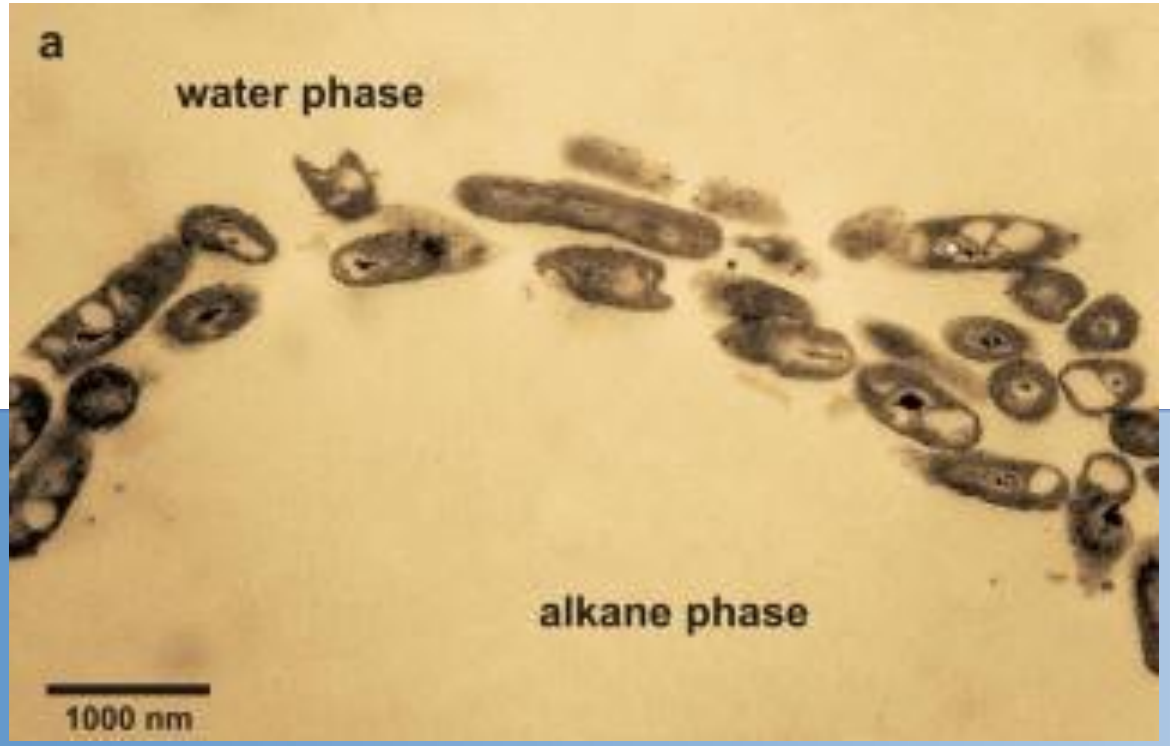
## Soil Bioremediation: Bacteria

# Bacteria Work in the Aqueous Phase to Degrade Oil to Mostly Water and Carbon Dioxide



## Landfarming: Role of Surfactants

# Desorption of Bound Contaminants to the Aqueous Phase is Required for Bioremediation

### Application of PINKWATER

- Promotes desorption and solubilization of oil
- Improving bioavailability
- Which accelerates bioremediation

# Example Treatment Protocol for Soil Bioremediation

Regular mixing to provide oxygen and distribute moisture is critical.

| Action | Discussion |
|---|---|
| Soil Assessment | Analyze soil for TPH, heavy metals, salinity, pH and other rate inhibiting factors. Confirm soil is suitable for bioremediation. |
| Prepare Soil for Treatment | For highly contaminated soils (>50,000 ppm), blend with clean or less contaminated soil; adjust pH and add organic material as needed. Analyze TPH to confirm starting point. |
| Begin Treatment | Spread contaminated soil over treatment area to depth not more than 25 cm; apply amendments (e.g., nutrients and surfactants); adjust moisture as required. Mix soil thoroughly! |
| Weekly | Turn or till soil to aerate, assuring an even supply of oxygen to the bacteria. Adjust moisture as needed |
| Every 7 – 14 days | Reapply amendments (based on level of contamination and level of microbial activity); adjust soil moisture; test for TPH to monitor bioremediation. Mix soil thoroughly to aerate and evenly distribute amendments and moisture. |

Product Applications

SOIL REMEDIATION

# How to Bioremediate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## Objective

- Accelerate natural microbiological a to remediate contaminated soil

## How to Use

- Test soil to assure suitability of bioremediation process.
- Apply a 6% solution of PINKWATER to contaminated soil and mix thoroughly to assure solution contacts all soil. If required, add nutrients (fertilizer) to solution.
- Cover or mulch to maintain soil moisture. For heavily contaminated soil reapply 2 –
- 3 times every 14 to 21 days. Turn soil periodically.
- Soil must have access to oxygen to support bioremediation.

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# Soil Bioremediation Case Studies



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SOIL REMEDIATION

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| TPH Levels in mg/kg (ppm) | | | |
|---|---|---|---|
| **Sample ID** | **March** | **May** | **Change** |
| A1 | 1,148 | 299 | -74% |
| A2 | 1,513 | 321 | -79% |
| B1 | 467 | 210 | -55% |
| B4 | 2,648 | 330 | -87% |
| C3 | 279 | 129 | -54% |
| C4 | 1,885 | 521 | -72% |

A pipeline rupture contaminated approximately 20 acres with light crude oil. Two years following initial cleanup work, the site still contained high levels of crude.

The site was divided into two areas. The heavily contaminated area was treated with 6% PINKWATER and the moderately contaminated area was treated with 3% PINKWATER. Fertilizer was added to both areas as a nutrient supplement.

Product Applications

SOIL REMEDIATION

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# 1. Oil Spill at a Storage terminal

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Product Applications

SOIL REMEDIATION

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# 2. Applying PINKWATER During Treatment of Spill

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Product Applications

SOIL REMEDIATION

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## 3. 60 Days After Oil Spill

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| Time | TPH (mg/kg) ppm | % of Change |
|---|---|---|
| Start | 47,000 | - - |
| 14 Days | 17,000 | 64% |
| 21 Days | 6,000 | 87% |

## Oil Based Mud Drill Cutting Pit

- Drilling mud, contaminated with diesel oil, was collected in a lined pit for treatment.
- Mud was blended with local topsoil to reduce contamination below 50,000 ppm.
- The mud was treated with PINKWATER at the start of a pilot test and reapplied after 10 days.
- After 21 days, TPH levels were reduced by 87%, meeting the Texas specification of
- <10,000 ppm (1%).

# Vapor Suppression & Odor Control

Diluted in large mixing tanks, PINKWATER is used a major remediation and construction work-sites where excavation of contaminated soils may release noxious organic odors of hazardous VOCs. PINKWATER is sprayed directly onto the soil or the stockpiles of contaminated material. PINKWATER creates a barrier that keeps the vapors in the soil allowing work to continue safely and the surrounding neighborhoods free from odor.

## Best Practices

# Operator Tips for Effective Odor Control

### Objective: Keep Odors in the Soil

- PINKWATER works on contact with petroleum hydrocarbons to prevent VOCs (and odors) from being released.
- VOCs and odors are formed on the surface (top ½ inch) as new contaminated soil is exposed.
- Treat contaminated soil as soon as it is exposed.
- Use a firm, course spray that will thoroughly wet the surface with no runoff. Avoid excess misting.
- If using a pressure washing system, use a wide angle nozzle at a distance and pressure that will not dislodge soil particles.
- Intermittent spraying with higher volume flow is more effective than continuous spraying with lower volume flow.
- As site safety conditions allow, spray exposed soil as squarely as possible.
- VOCs / odors increase as the temperature rises. Humidity and wind conditions will also impact the need for odor control

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# Additional Information for Effective Odor Control

- A 6% PINKWATER solution provides optimum vapor suppression leading to good odor control.
- When preparing a solution, always add PINKWATER concentrate to water
- The application systems should be capable of 2 – 5 gallons per minute. Use open nozzle to achieve coarse spray and minimize mist.
- For low pressure systems, the dynamic head should be greater than 100 feet. Use at least a ¾” garden hose to minimize pressure drop and an adjustable nozzle to generate a firm, coarse spray.
- Vapor suppression impact is immediate and full control lasts about 1 hour or until the soil is disturbed.
- Cover stockpiles that are open to the air for more than 60 minutes or respray.
- Use safety glasses or goggles to protect eyes from spray blowback.

Product Applications

VAPOR SUPPRESSION

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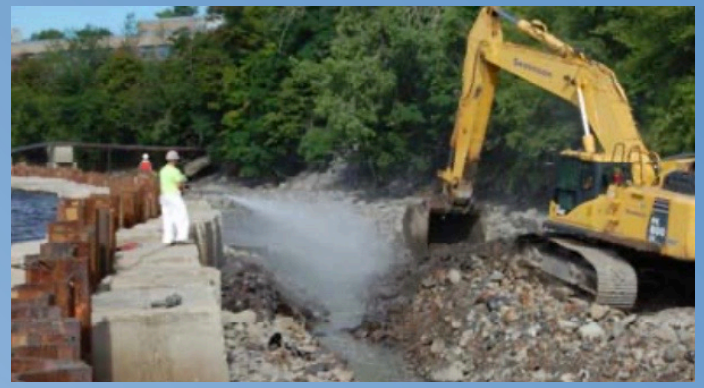
# Effective Misting



- As a second line of defense, PINKWATER can be “misted” into the air near the point of excavation to capture fugitive vapors.
- Misting can be accomplished with:
- Fogger nozzle
- Power Spraying System
- During misting, the spray should be directed above the soil, not on the soil.
- Typical application rate is 1 – 1.5 gallons per minute

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Product Applications

VAPOR SUPPRESSION

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- Former steel and coke operation
- One million metric tons of heavily
- contaminated soil (PAHs)
- Technology selected: “Solidification and Stabilization”
- 77 acre site divided into 2,500 cells
- Dense residential area nearby

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Product Applications

VAPOR SUPPRESSION

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# Initial odor control plan had to be updated quickly

- Initial treatment plan resulted in numerous complaints from abutters and threatened to curtail operations.
- PINKWATER was used.
- Operators applied a 6% PINKWATER solution through stationary and mobile spraying systems.
- Complaints subsided and PINKWATER was used for the duration of the project.

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Stationary “misting” sprayer



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# Emergency Spill Response

PINKWATER eliminates fire and explosive hazards when sprayed directly onto a fuel/oil spill. Aggressive agitation reduces volatilization and causes LEL readings to immediately decline, possibly registering “0.” Application of PINKWATER also facilitates roadway cleanup and the elimination of hazardous oil sheen.

# PINKWATER Emergency Response

## Features & Benefits

- Promotes full removal and recovery of hydrocarbons.
- Eliminates road sheen that may pose a driving hazard.
- PINKWATER will NOT harm asphalt
- It will minimize the deterioration to asphalt from fuel spills.
- Promotes biodegradation of hydrocarbons that may be washed into drainage areas.
- Non-hazardous
- Non-corrosive
- PINKWATER has no adverse impact on wastewater treatment operations that rely on aerobic sand anaerobic bacteria.

Product Applications

EMERGENCY RESPONSE

# Best Practices and Procedures

PINKWATER™
HYDROCARBON MITIGATION AGENT

## Small Spills

- On small spills, PINKWATER may be introduced via a water extinguisher or Indian tank-type sprayer.

## Steps:

- Prepare a 12% Solution of PINKWATER
- Cover entire spill with PINKWATER.
- Work in a circular motion from the outside perimeter toward the center of the spill.
- Thoroughly agitate the spill area with a forcible stream of water using a coarse spray.
- Wash or brush to a containment area for disposal (as local rules permit).

MARKET STREET VENTURES

Product Applications

EMERGENCY RESPONSE

# Best Practices

PINKWATER™
HYDROCARBON MITIGATION AGENT

## Large Spills

- PINKWATER can be applied through a fire hose using a foam eductor system.
- Set the eductor to 6% checking that inlet pressure and flow rate are matched to the eductor for proper proportioning.
- Set standard adjustable or automatic nozzle at hard cone to coarse spray.

## Sewer Spills

- Fuel spills that have entered the sewer system pose a unique challenge for emergency responders.
- Apply PINKWATER directly into the manhole or storm drain.
- Flush / agitate with plenty of water from a high pressure nozzle
- Where possible, collect effluent from a downstream storm drain port for secondary treatment.

MARKET STREET VENTURES

# Equipment Cleaning Decontamination Surface Washing

PINKWATER is used for cleaning / decontaminating tools and equipment at remediation sites, in refineries, on drilling rigs, following spill cleanup, and in industrial maintenance operations. Generally applied with standard pressure washing equipment, most oil and tar build-up can be washed away on contact. For more severe contamination, a hot water spray system may be required.

PINKWATER™ HYDROCARBON MITIGATION AGENT

## Equipment Cleaning, Decontamination, and Surface Washing

# Features & Benefits

- Safe for workers and the environment.
- Reduces unnecessary exposure to hazardous materials and slipping.
- Economical
- Aggressively tackles the most challenging clean-ups with outstanding results.
- Equipment Longevity: Regular use helps maintain equipment in good working order by preventing build-up of oils and grease.
- Leaves no oily residue on equipment, roadways, loading docks, or factory floors.
- Eliminates “slipping hazards” on hard surfaces.
- Easy to mix and apply with any standard pressure washer.
- Low foam formulation
- Produces little or no foam during application.
- Minimizes regulatory requirements associated with handling and disposing of caustic and hazardous solvents found in many cleaners.
- PINKWATER can be applied with standard pressure washing equipment.
- Regulatory Compliance: Minimizes the need for handling and disposal of hazardous solvents, helping meet regulatory requirements.

PINKWATER
HYDROCARBON MITIGATION AGENT™

## Equipment Cleaning

# Best Practices

### Site Assessment:

- Assess the area to be cleaned, considering local rules, regulations, and the collection of effluent.
- Determine the best place to dispose of wastewater, ensuring that permits are obtained as required.
- Solution Preparation:
  - Mix PINKWATER concentrate with water in a poly tank or suitable container to achieve the desired concentration, usually 6%.

### Application:

- For Equipment Cleaning:
  - Prepare the equipment for power washing and protect sensitive areas.
- For Surface Cleaning:
  - Check the integrity of surfaces and take precautions if pressure washing may cause damage.
- Apply with a commercial pressure washer (2-5 gpm, 2000-5000 psi) based on the contamination severity and surface condition.
- Hot Water: Using hot water can further improve performance, especially on heavily contaminated areas.

## Surface Washing

# Additional Tips for Enhanced Performance

*No detrimental effects on aluminum surfaces when using PINKWATER at room temperature.*

### Horizontal Surfaces:

- A power washer cowl is recommended to reduce back splashing.

### Porous Surfaces:

- For unsealed surfaces like concrete or asphalt, apply PINKWATER to the contaminated area before pressure washing. Let it sit for up to an hour for better absorption and improved performance.

### Rinsing:

- After cleaning, rinse with clear water and let the area dry. Repeat as necessary, especially for heavy contamination.

### Testing Results:

- Oil Removal: 100% effectiveness.
- Lubricant Removal: 99% effectiveness.
- Grease Removal: 94% effectiveness.

END PRESENTATION

# Applications & Markets

PINKWATER
HYDROCARBON MITIGATION AGENT™

## Emergency Response

- Clean up fuel spills
- Reduce fire & explosion hazards
- Disperses fuel spills on water

## Soil Remediation

- Mobilizes residual hydrocarbons
- Emulsifies hydrocarbons for hydraulic recovery
- Accelerates bioremediation



MARKET STREET VENTURES

# Applications & Markets

PINKWATER™
HYDROCARBON MITIGATION AGENT

## Vapor Suppression

- Controls nuisance odors and hazardous VOCs
- For use during active excavation

## Industrial Maintenance

- Cleans & degasses tanks and pipelines
- Decontaminate equipment
- Scrubs industrial process gas



MARKET STREET VENTURES

CASE STUDY

# Emergency Response

PINKWATER
HYDROCARBON MITIGATION AGENT™


## Whitefield Avenue Station
Stoke Park, Illinois

- A 9,000 gal tanker was delivering E-10 gasoline to a gas station
- The driver turned the cargo tanker much to close to the stations service island.
- The service island sheared of one of the tankers 3 external unloading valves.
- The gasoline began to pour out of the damaged valve onto the stations concrete pad and into the sewer drain

MARKET STREET VENTURES

CASE STUDY

# Emergency Response

PINKWATER™
HYDROCARBON MITIGATION AGENT

## Hazmat Response

- Hazmat team attempted to utilize the internal shut-off valves but was ineffective
- Utilizing Class B Foam, emergency responders were able to cover the spill
- Two suited men were then able to use a
- pneumatic plug to stop the leaking valve
- As is often the case, before too long, the foam blanket started to break down

MARKET STREET VENTURES

CASE STUDY

**SEAR**

PINKWATER

HYDROCARBON MITIGATION AGENT™

# Former Service Station

## Massachusetts

MARKET STREET VENTURES

CASE STUDY

# Vapor Suppression

PINKWATER™

HYDROCARBON MITIGATION AGENT

# Sydney Tar Ponds

Nova Scotia, Canada

MARKET STREET VENTURES

CASE STUDY

# Sydney Tar Ponds

Nova Scotia, Canada

PINKWATER
HYDROCARBON MITIGATION AGENT™

Epilog:

## Creating a new public park



MARKET STREET VENTURES

CASE STUDY

# West Texas

PINKWATER™ HYDROCARBON MITIGATION AGENT

| Time | TPH (mg/kg) ppm | % Change |
|---|---|---|
| Start | 47,000 | -- |
| 14 Days | 17,000 | 64% |
| 21 Days | 6,000 | 87% |

- Drilling mud, contaminated with diesel oil, was collected in a lined pit.
- Mud blended with local topsoil to reduce contamination below 50,000 ppm.
- Initial treatment with PINKWATER; reapplied after 10 days.
- After 21 days, TPH levels were reduced by 87%, meeting Texas standards

MARKET STREET VENTURES

PINKWATER
HYDROCARBON MITIGATION AGENT™

# PINKWATER products fit any organizations portfolio for hydrocarbon mitigation

**Effective**

**Easy to Use**

**Worker Friendly**



MARKET STREET VENTURES

PINKWATER (concentrate)

# PINKWATER was specifically developed to encapsulate hydrocarbons

- Reduces volatility and hence flammability
- Excellent VOC and odor control
- Will emulsify 20 times its volume of hydrocarbons
- Leaves no residue on hard surfaces



MARKET STREET VENTURES

# Selected PINKWATER US Customers

PINKWATER™ HYDROCARBON MITIGATION AGENT

## Emergency Response

Campbell County (WY)
CG Industrial Safety
East Fishkill FD (NY)
FD of New York, Haz Mat
Fire Hydraulics Co.
Garden City FD (NJ)
Getz Fire EquipCo
Longview FD (TX)
Oakland County HazMat
Oil SpillResponse Ltd
Rapid Response
Springfield FD (MO)

## Soil Remediation

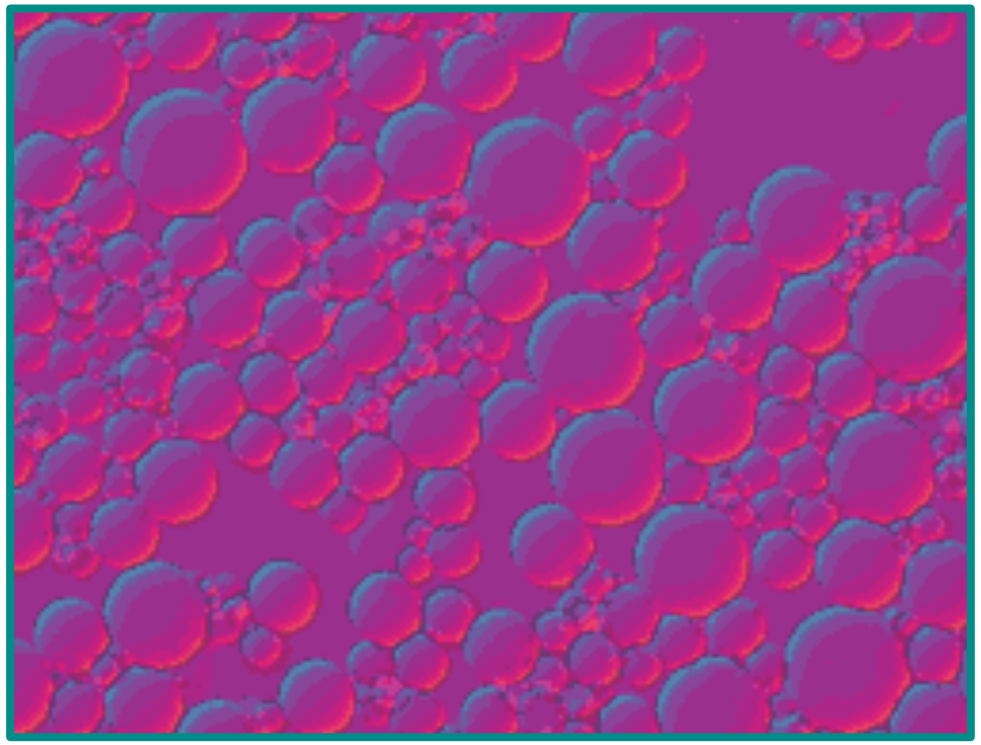
AECOM
ARCADIS
ATC
ECC
EnviroTrac
ESC
Kleinfelder
SAIC
Sevenson
URS
Veolia
WRScompass

## Industrial Maintenance

Allstate Power-Vac
BP
Chevron
Chrysler / Ford / GM
Exxon Mobil
Hampton Roads Sanitation
JACAM
NY City Transit
PhillipsPetroleum
PSC
ShellOil
Veolia

## What is bioavailability?

# These micro-encapsulated oil droplets are called *micelles*



Micelles have a high ratio of surface area to volume, making the oil more available to bacteria

**Microphotograph of surfactant micelles (45μm x 65μm); dye added to enhance resolution**

# Bioremediation Effectiveness

**Assess aerobic biological activity by measuring carbon conversion to $CO_2$. Five $CO_2$ conversion tests were conducted at the University of Alabama as follows:**

- For each test a quantity of thoroughly mixed soil or beach sand was divided into two equal parts
- Each part had an equal amount of radioactive carbon marked contaminant mixed into it.
- Each part had an equal amount of water mixed in, one part with only water and one part with water and PINKWATER.
- Each part was enclosed and the $CO_2$ conversion was measured
- Each of the five tests had a different type of contaminate and/or different levels of contamination

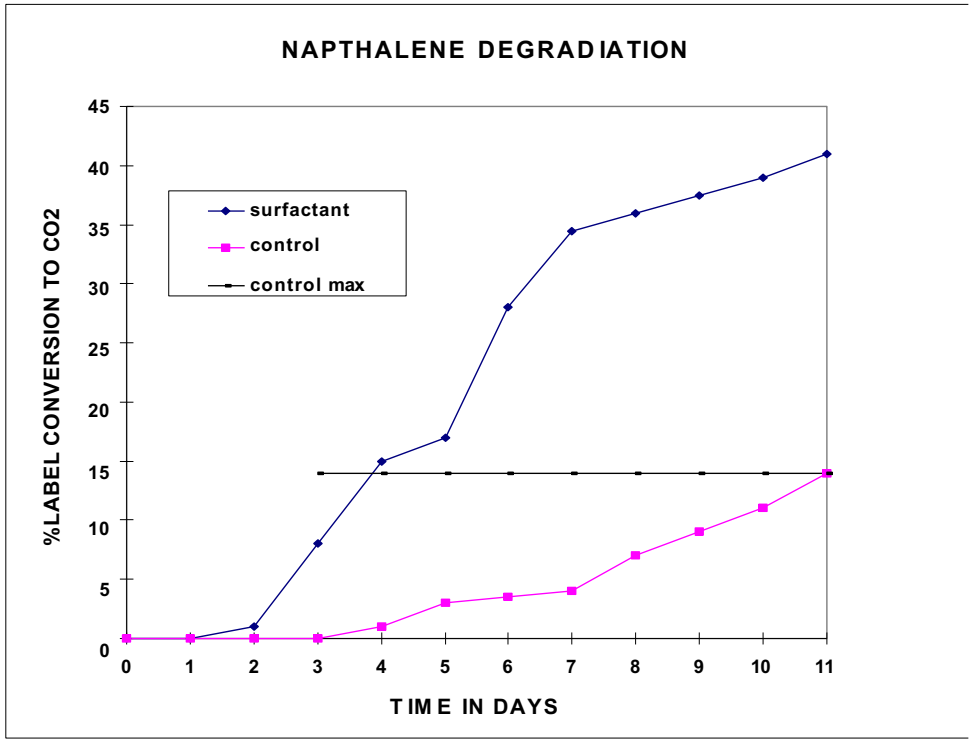
# Bioremediation Test #1

## Test #1: Relatively light refined product (naphthlene)

After 11 days the conversion to $CO_2$ in the control was about 15%.

The PINKWATER sample achieved the same conversion in about 4 days. PINKWATER sped up the bioremediation process by a factor of 2.9.

After 11 days, $CO_2$ conversion in the PINKWATER sample was 40%



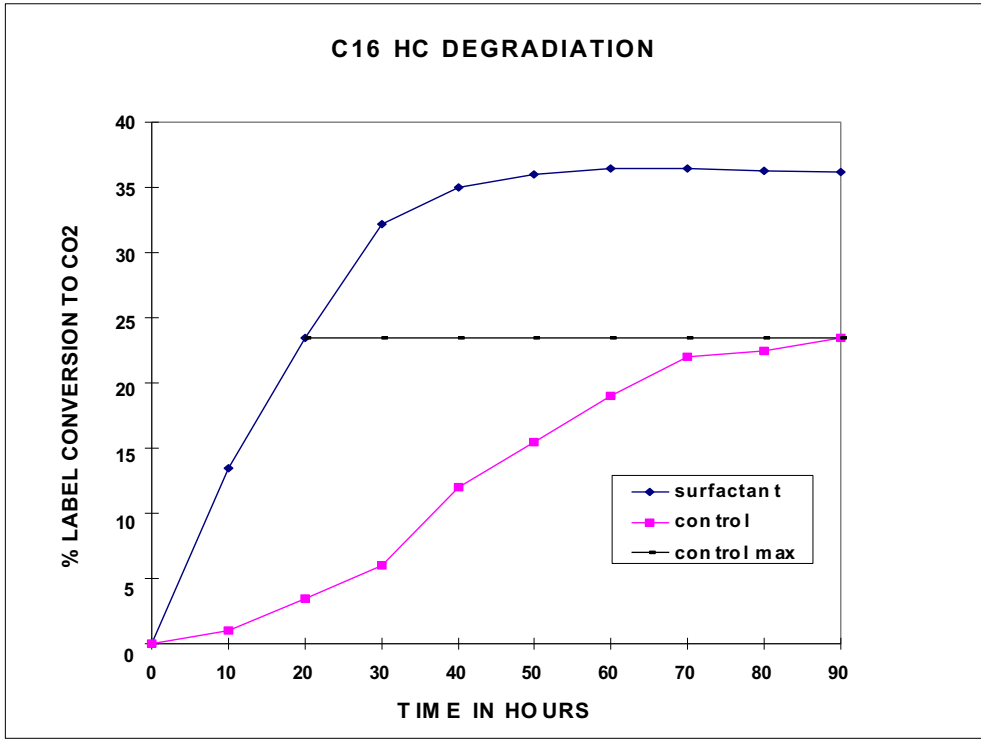
# Bioremediation Test #2

## Test #2: Crude oil

After 90 hours the conversion to $CO_2$ in the control was about 23%.

The PINKWATER sample achieved the same level of conversion  in about 17 hours. This implies that PINKWATER sped up the bioremediation process by more than 5 times.

After 90 hours, $CO_2$ conversion in the PINKWATER sample was more than 35%.



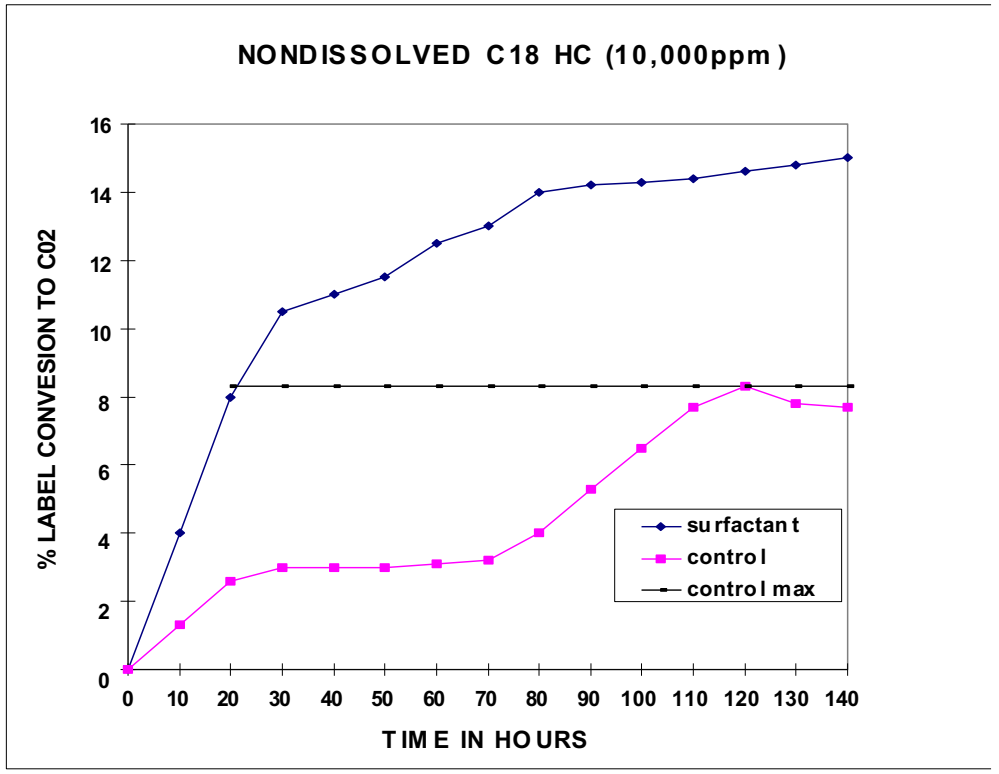
# Bioremediation Test #3

## Test #3: Crude oil on dry soil

The oil was poured on the soil and mixed; water or water and PINKWATER was added and the soil mixed again.

The control reached a $CO_2$ conversion of 8.3% after 120 hours.

The PINKWATER sample reached 8.3% conversion in about 21 hours or about 6 times faster.



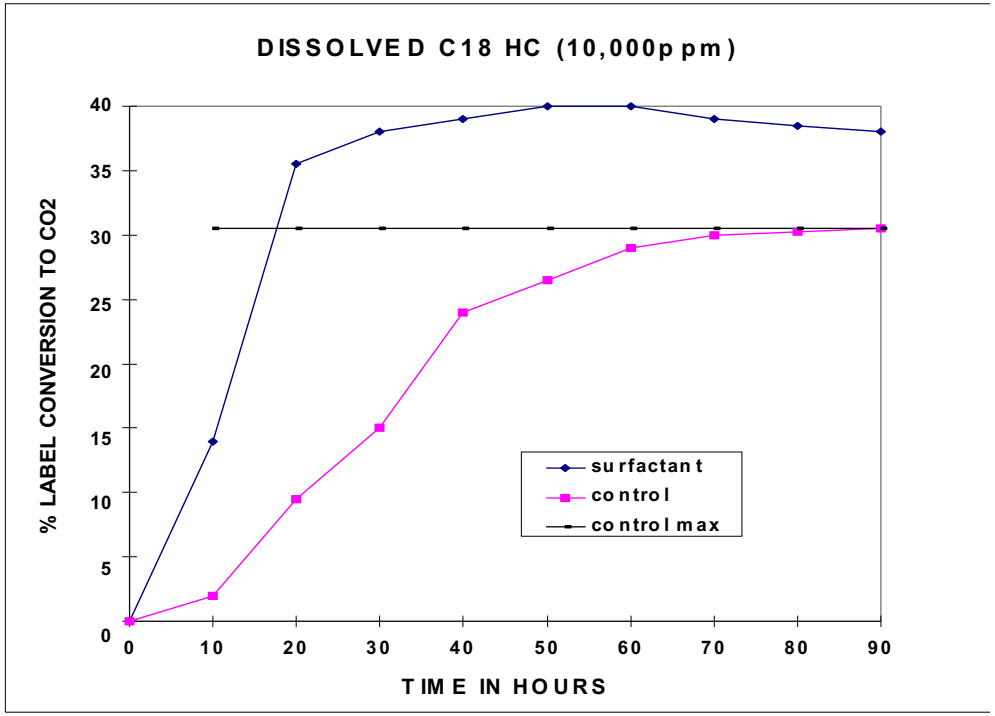
# Bioremediation Test #4

## Test #3: Crude oil on wet soil

The soil was wetted with water and then oil was mixed with water before being put on the soil.

The control reached a $CO_2$ % conversion of 30.5% in 90 hours.

The PINKWATER sample reached the same conversion in 17 hours or about 5 times faster.



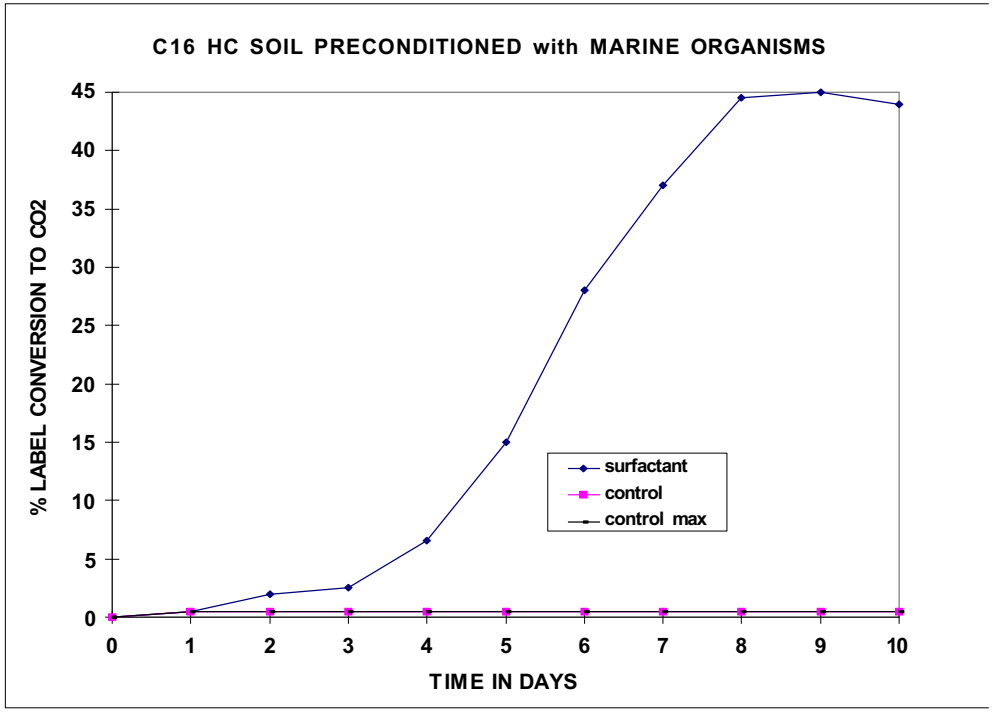
# Bioremediation Test #5

## Test #5: Crude oil on a sand beach

The soil was preconditioned with marine micro organisms for seven days.

In this test the control indicated very little remedial action.

The PINKWATER showed 45 % $CO_2$ conversion in 8 days indicating that PINKWATER can start remediation that won't start on it's own.



Tank Cleaning Best Practices

- **Sludge Removal and Reclamation:**
  - **Purpose:** For viscous or compacted sludge, or when there's a significant accumulation of sludge in the tank (e.g., up to a foot or more).
  - **Procedure:**
    - **PINKWATER Mixing:** PINKWATER, a cleaning agent, is mixed into the sludge to create a pumpable effluent. The sludge is often treated with hot water or steam to improve the solubility and ease of removal.
    - **Oil/Water Separation:** If the sludge contains hydrocarbons, the effluent is passed through an oil/water separator (or frac tank) to capture the emulsified hydrocarbons for disposal. This step helps in recycling the aqueous phase of the solution, reducing waste.
    - **Recycling the PINKWATER:** After separation, the remaining solution can be reused, potentially with additional PINKWATER concentrate added to maintain its cleaning power.
    - **Batch Processing:** In some cases, the solution is circulated through the tank repeatedly until it binds with the oil. The solution is then pumped out to the frac tank for separation. Residual sludge is disposed of following environmental regulations.

Tank Cleaning Best Practices - Continued

- **Manned Entry:**
  - **Purpose:** To clean hard-to-reach areas and perform maintenance that requires human intervention.
  - **Preparation:** Once the tank is sufficiently cleaned (through sludge removal and chemical cleaning), it is deemed safe for manned entry. Personnel enter the tank to perform tasks such as:
    - Power washing paraffins and other residues from walls and structures.
    - Carrying out necessary maintenance tasks, such as repairs or inspections.
- **Scraping & Brushing:**
  - For smaller tanks or localized contamination, manual tools are employed.
    - **Manual Cleaning:** Scrapers and wire brushes are used by personnel to physically remove sludge, residue, and deposits. This is typically done in areas where automated cleaning methods are not effective or practical.

**5. Drying:**

- **Purpose:** To remove any moisture left from cleaning processes, ensuring the tank is dry and safe for further use.
- **Procedure:**
  - **Air Drying:** After chemical or water-based cleaning, air drying is often employed to eliminate any remaining moisture.
  - **Mechanical Drying:** If available, industrial dryers may be used to speed up the drying process, especially in larger tanks or where moisture could lead to corrosion or other

Tank Cleaning Best Practices - Continued

**Chemical Cleaning:**

- **Purpose:** To remove oil, sludge, and other residues from the tank's internal surfaces.
- **Procedure:**
  - **Solution Preparation:** PINKWATER concentrate is diluted with water to create a 6% working solution. The general guideline is to mix 1 gallon of PINKWATER concentrate for every 10–20 gallons of residual hydrocarbons in the tank.
  - **Application:** The PINKWATER solution is applied via automated pressure-washing systems (e.g., water cannons, rotary impingement equipment like Gamajet®) to loosen sludge and residues from tank walls, roofs, and internal structures.
  - **Hydrogen Sulfide Control:** PINKWATER also helps manage hydrogen sulfide (H2S) levels, and can be combined with other hydrogen sulfide scavenger products, though compatibility should always be verified beforehand.
- **Manned Entry:**
  - **Purpose:** To clean hard-to-reach areas and perform maintenance that requires human intervention.
  - **Procedure:**
  - **Preparation:** Once the tank is sufficiently cleaned (through sludge removal and chemical cleaning), it is deemed safe for manned entry. Personnel enter the tank to perform tasks such as:
    - Power washing paraffins and other residues from walls and structures.
    - Carrying out necessary maintenance tasks, such as repairs or inspections.

# Tank Cleaning & Degassing