Imbibitive Technologies

presents

"Oil-Sensitive" Super-Absorbent Polymer Innovations in Environmental Technology

OSPR/Chevron Technology Workshop

March 27th – 28th, 2023

Imbiber Beads®
Super-Absorbent Polymers

- **"Oil-Sensitive" – absolute & selective capture & containment of organic liquids. Unaffected by water.**
- **"Engineered" for oils, fuels & solvents**
- **Elimination of the "liquid phase"**
- **Drastic reduction of hazardous vapor off-gassing (LEL)**
- **ASTM - Must "swell" 50% or more original size**
- **Must be 70% insoluble in excess liquid.**

How Do Imbiber Beads® Work?

Representative List of Organic Liquids "Imbibed"

Crude Oil – Louisiana Sweet, West Texas, Alyeska North Slope, Diluted Bitumen

Transportation Fluids – gasoline, JP_4, JP_5, JP_8, Jet-A, Jet A-1, No. 1, 2, 3 Fuel Oil

Chlorinated Solvents – Trichloroethylene, PCBs, Perchloroethane, Carbon Tetrachloride, Trichlorobenzene

Aromatic Solvents – Benzene, Toluene, Ethylbenzene, Xylene, Styrene, Cumene, Methylnaphthalene

Polar Compounds – Vinyl Acetate, Methylisobutylketone, Tetrahydrofuran, Methylmethacrylate, Ethyl Acrylate


Diesel Fuel Absorption
(time elapsed 29 mins)

IMBICATOR®

Color-Change Technology

- **Eliminate Guess Work with colorless fuels and solvents.**
- **Visual Identifier of the "imbibition" process.**
- **Oil-sensitive Dye activates upon contact.**
- **Selective to oils, fuels & solvents only.**
- **"Sit & Soak" applications i.e. O/W separators, manholes, vaults or monitoring tool.**

Complementary to existing clean-up technologies

- ✓ **Improved recovery statistics - 85%+**
- ✓ **Reduced environmental impact**
- ✓ **Reduced socio-economic impact**
- ✓ **Reduced "Time and Materials"**
- ✓ **Significant operational cost reduction**

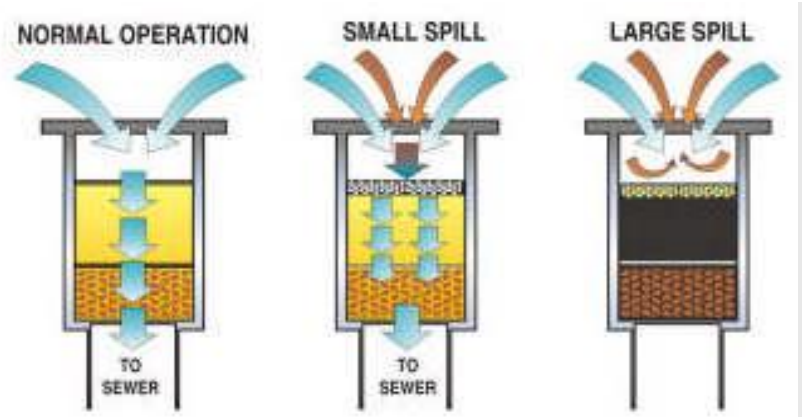
Hurricane Harvey – Houston, TX.
August 26th, 2017

22,000 Barrels – crude oil, BTEX, gasoline, diesel, jet fuel released

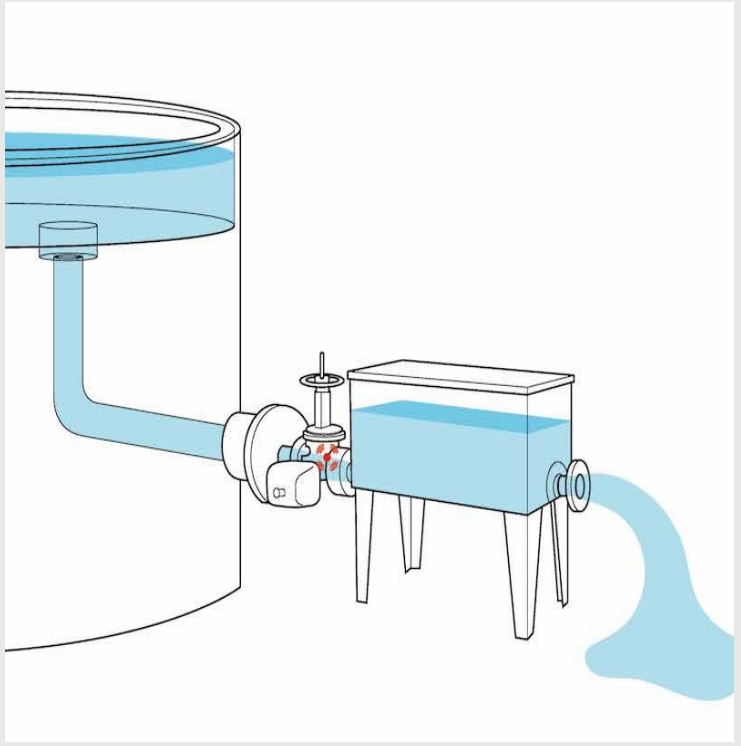
400 "Floating" Roof Tanks within Greater Houston

1-Million+ pounds of toxic air emissions

(Texas Commission for Environmental Quality)



Pollution Prevention

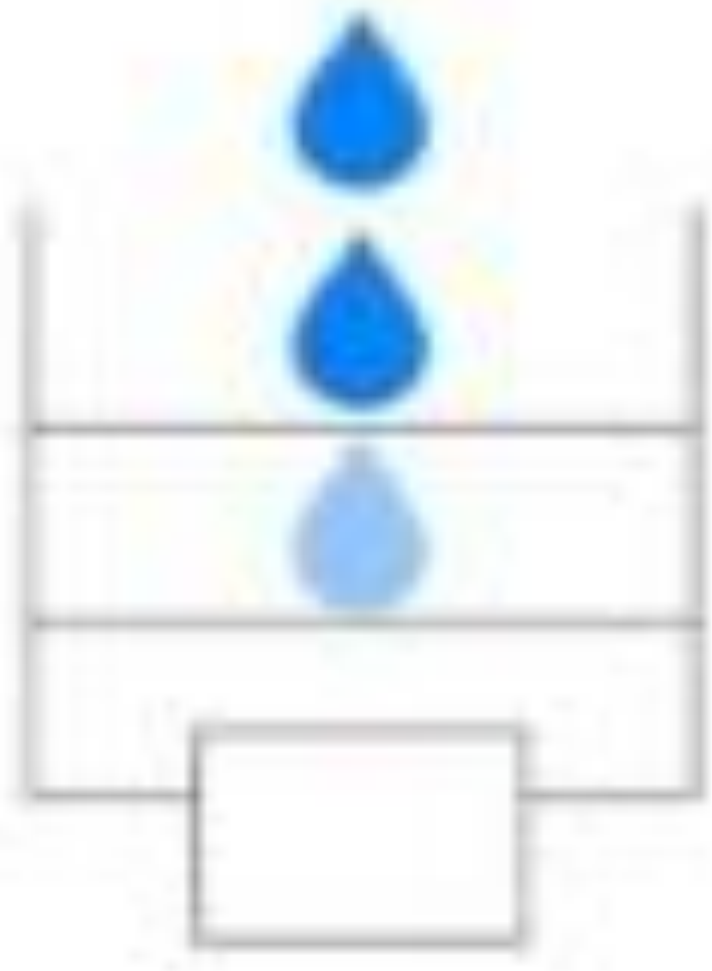


Intercontinental Terminal Fire
Deer Park, Texas

March 17th -28th, 2019

- **1,100 Federal, State, Local workers on-site – 17K operational hours**
- **233K barrels of run-off liquor (BTEX/Water/Foam collected from ITC site, local bayous and Houston Ship Channel**
- **Operational Clean-Up costs > $1-B**
- **Waste Disposal costs?**
- **Fines & Lawsuits?**
- **Houston Ship Channel demurrage costs @ $125-M/day?**

Normal Operation



Imbiber Beads® - Pre-Disaster Risk Mitigation
Cost Analysis

Inland Spills - Ports/Harbors

- March 2014 - Houston Ship Channel – Texas City "Y" - chemical release 168K gallons.
- 33-days @ operational cost = $125-Million
- Recovery rate = 5% of 168K gallons
- Value-proposition – cost/gallon recovered @ $14,880.00
- Relative Cost @ 100% recovery = $2.375-Billion
- Other Costs - Environmental/Socio-Economic/Political

Imbiber Beads® Inland Spills

- Houston Ship Channel – Texas City "Y" - chemical release 168K gallons.
- Estimate 3-days recovery operation
- Recovery rate = 85% of 168K gallons = 143K gallons
- Blankets @ 3 gal ea = 47,667 @ $100ea = $4.77 Million
- Disposal – Energy from Waste


“You must be the change you want to see in the world”
(Mahatma Ghandi,1869 – 1948)
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