

## EMERGENCY RESPONSE SUPPORT – BIOLOGICAL PRODUCT APPLICATION DIESEL FUEL PIPELINE RELEASE Tampa, Florida area

<b>Type of Project:</b>	Emergency Response/Interim Remedial Action
<b>Contaminants Treated:</b>	Diesel fuel
<b>Concentration:</b>	Unknown soil/GW concentrations within excavation boundaries
<b>Technology Applied:</b>	Bioremediation
<b>Geology:</b>	Medium to fine sand
<b>Treatment Interval:</b>	Sidewalls, floor of excavation (0 to 20 feet bgs)
<b>Average % Reduction:</b>	Unknown
<b>Timeframe:</b>	1 week
<b>Project Reference:</b>	Josh Hirten, URS Corporation (407) 992-5056

### DESCRIPTION

ETEC, LLC used our specialized biological enhancements in an emergency response application involving a pipeline release of diesel fuel to soil and groundwater. The release occurred adjacent to an active rail line and residential homes in a small Florida community, and large volumes of diesel-contaminated soil were excavated immediately following the release. However, residual contamination was evident in locations where excavation could not occur, as well as at the groundwater interface zone. ETEC mobilized large-scale equipment and BioPro™ products to accelerate degradation of this residual diesel fuel.



### PROJECT SPECIFICS

Response to the release was immediate, and the pipeline owner utilized consultants and contractors to perform cleanup and excavation activities over a 4-week period following the release. ETEC was contacted during the first week following the release and asked to provide and apply biological enhancements to excavation pits as they were completed.



Within 48 hours of being contacted, ETEC mobilized 2 field engineers and 6,000 lbs. of biological products to the site. Assorted loading, mixing, and application equipment, including a 1,500-gallon capacity water truck and forklift, were also mobilized. An additional 4,000 lbs. of biological products was mobilized due to the size and extent of the excavations, resulting in a total of 10,000 lbs. of nutrients and biological amendments for the project.

Over a 7-day period, ETEC field engineers mixed more than 20,000 gallons of solution and applied it to the base and sidewalls of all available excavation cavities. The following table summarizes the masses and volumes of solution applied to each excavation cavity.

Excavation Zone	Bacteria Mass Applied	Enzyme Mass Applied	Nutrient Mass Applied	Total Solution Volume
Zones 1, 2, 3	1,600 lbs.	400 lbs.	2,000 lbs.	Unknown
Zone 5	200 lbs.		200 lbs.	2,800 gallons
Zone 6	150 lbs.	25 lbs.	500 lbs.	1,500 gallons
Zone 7 North	800 lbs.	275 lbs.	2,650 lbs.	11,500 gallons
Zone 7 South	450 lbs.	100 lbs.	650 lbs.	4,500 gallons
<b>TOTALS</b>	<b>3,200 lbs.</b>	<b>800 lbs.</b>	<b>6,000 lbs.</b>	<b>20,300 gallons</b>

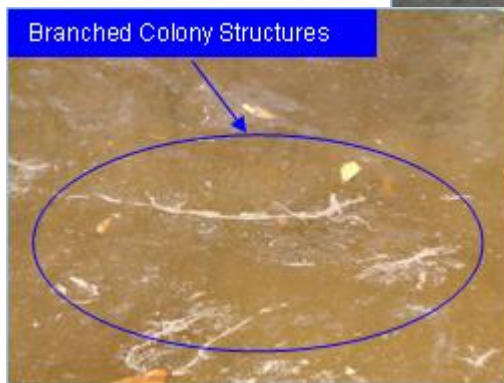
Note: Zone 1,2,3 injections performed by excavation contractors at a later date

## PRODUCT INFORMATION

Our PetroBac™ product bundle, consisting of concentrated hydrocarbon-degrading microbes and enzyme complexes, was coupled with our NutriMax/CBN™ nutrient mix to treat vadose (unsaturated) soil and saturated soil and groundwater. Treatment of upper soil was very important, since the diesel release had pooled on the surface and migrated downward, resulting in significant vadose soil impact. While much of this soil was excavated, some soil could not be removed due to its proximity to various structures. The applied nutrients and bacteria are designed to support degradation of petroleum in soil and groundwater, and are capable of providing extended treatment of the residual diesel fuel.

## RESULTS

Within 48 hours of biological product application to the most heavily-impacted groundwater zones (see pads which were placed to soak up free-phase fuel), exponential microbial growth was evident to the naked eye.



Although an evaluation of results is difficult due to the lack of baseline data immediately after the diesel release, post-excavation data shows DRO concentrations below regulatory levels in all product application areas except the source zone. Free product still remains in the immediate vicinity of the pipeline failure, and is being actively recovered.