

Lyondell-Citgo Refinery

In June 1999, about 20,000 gallons of lube oil was spilled onto the ground surrounding several storage tanks at a Lyondell-Citgo refinery in Houston, Texas.

As the spill occurred at Tank 99, oil flowed downhill past a pump pit and between Tank 98 and Tank 112.

Samples of the clay soil were taken from each of the three locations on June 30 and evaluated at the Core Environmental Laboratory and Sam Houston State University's TRIES Laboratory.

At the Tank 99, TPH levels were a whopping 130,000 ppm. At the pump pit, TPH was 26,800 ppm. The EPA required TPH to be brought below 10,000 ppm.

Conventional wisdom suggested that the only way to successfully remediate this site would have been to scrape away the contaminated soil and haul it to a land farm or incinerator.

But a week later, on July 6, VB997® was applied to the site. After white rock had been moved away from

the contaminated area, VB997® was tilled into the contaminated soil at the rate of 1 pound per cubic yard. For the duration of the project, soil moisture was maintained at 15 percent.

Follow-up samples taken on August 6 showed the remarkable changes that took place. TPH at Tank 99 was reduced nearly 95 percent to 6,650 ppm.

All three locations were successfully brought below 10,000 ppm in just 30 days, low enough to be acceptable under TNRCC guidelines.

Location	TPH Level		Plate Count	
	June 30, 1999	August 6, 1999	June 30, 1999	August 6, 1999
Tank99	130,000 ppm	6,650 ppm	1.7x10 ⁶ cfu	5.7x10 ⁵ cfu
Pump Pit	26,800 ppm	8,320 ppm	1.8x10 ⁵ cfu	1.8x10 ⁵ cfu
Between Tanks 98 and 112	1,370 ppm	1,870 ppm	8.6x10 ⁵ cfu	5.7x10 ⁶ cfu

Lovell, Wyoming Refinery

The Lovell, Wyoming refinery is a 40-acre site that had been heavily contaminated by waste petroleum sludges and products. This U.S. Environmental Protection Agency Superfund cleanup site had high levels of hydrocarbon contamination (30,000 ppm average) and was hazardous because of its close proximity to waterways.

For the site, only four potential products were selected as candidates from the EPA's National Contingency Plan (NCP) Product Schedule.

These candidates were pitted against each other in a carefully controlled lab test. Contaminated soil from the site was mixed for uniformity and each product was applied following the manufacturer's instructions.

The test evaluated the products' ability to break down alkanes as well as aro-

matics which are more difficult. After 60 days it was clear that VB997® was the most effective product (see graph).

A continual monitoring of all treatments for cumulative oxygen consumption and carbon dioxide production was performed. A direct correlation

can be seen between oxygen consumption and carbon dioxide production for all treatments through day 60. Additionally, VB997®, which showed the highest analyte degradation, also showed the most positive response in the respirometric study.

Percent reduction of hydrocarbons after 60 days

