

## Diesel Fuel Dual-Phase Vacuum Extraction Groundwater Remediation with HC-2000 Accelerator & Desorption Agent

**Location: Atlanta, Georgia**

**Client: Major Bus Company**

**Contract Cost: \$850,000+**

### PROBLEM

Remtech was engaged by a major bus terminal to remediate an estimated 7,000-gallon diesel fuel release from a 20,000-gallon underground storage tank. The 0.33-acre plume of fuel was located with 33 monitoring wells under a bus wash/service building and parking lot. Remtech secured reimbursement from the State's Leaking Underground Trust Fund for this project.

### SOLUTION

Seventeen (17) recovery wells were installed following removal of the leaking UST. A Remtech dual-phase vacuum extraction system was installed that consisted of a rotary claw blower, knockout tank, oil/water separator (OWS), multimedia pre-filters and activated carbon post-filters. This project was complicated by tight clay soils (conductivity of  $6.3 \times 10^{-6}$  cm/sec) and iron bacteria floc biofilm that clogged filtration systems. Dissolved air floatation (DAF) and calcium chloride coagulation/flocculation were added to the oversized OWS to assist with the separation of entrained fuel from the bio-floc. For every gallon of fuel recovered, 1/3<sup>rd</sup> gallon of iron bacteria sludge had to be separated. Entrained fuel separation was achieved by placing sludge in thickening tanks with extended retention times. This was one of the worst iron bacteria fowling problems encountered in the State of Georgia.

Iron bacteria buildup in the wells required well rehabilitation with surge blocks, jetting, hydrochloric acid, calcium hypochlorite, hydrogen peroxide, citric acid, glycolic acid, and HC-2000 injection.

48.44% of the free product was removed during the first four (4) years of operation of the dual-phase extraction system.

To accelerate the completion of this remediation project, approval was received from the State to inject Remtech's proprietary HC-2000 bioremediation accelerator and desorption agent. 92.63% of the remaining free product was removed with seven (7) injections of HC-2000 during the final year of the treatment program. The small quantity of free product remaining was determined to be immobile, stable, with no impacted downstream receptors.

An estimated 2,300 gallons of fuel were recovered over a five year period (not including bioremediated fractions of free product).

This site was closed as a low risk site and a *No Further Action Letter* was received from the State UST Program.

### COST/BENEFITS

Project costs were completed for approximately \$159/cy even with the unusual elevated iron bacteria biomass which accounted for over 30% of project costs. The client was reimbursed for this project by the State GUST Fund.



Remtech Two-Phase Vacuum Extraction



Remtech's Total Fluids Treatment Trailer

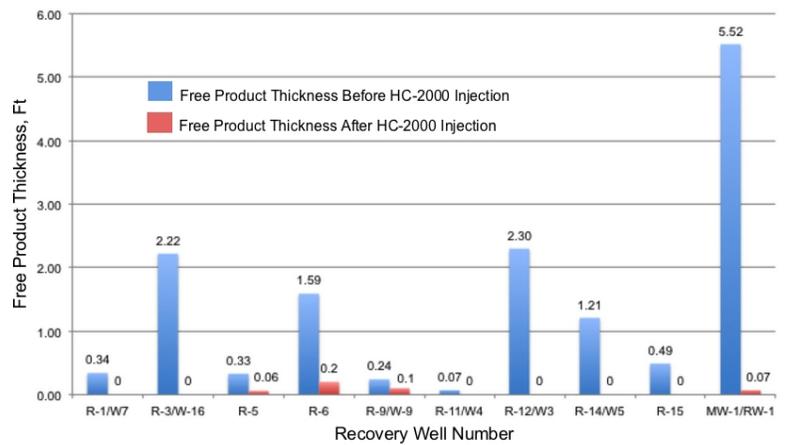
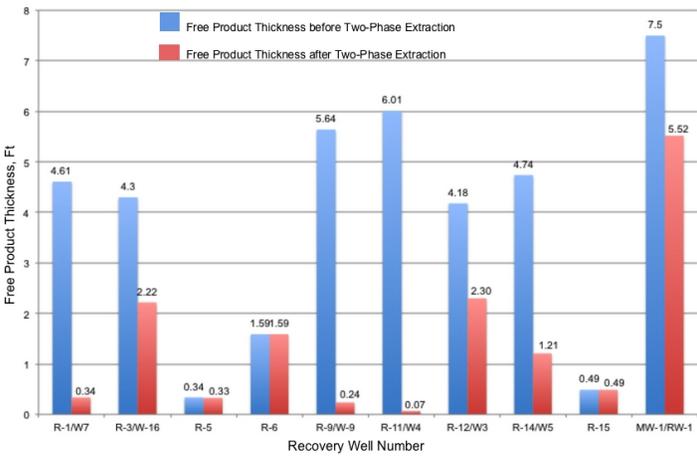
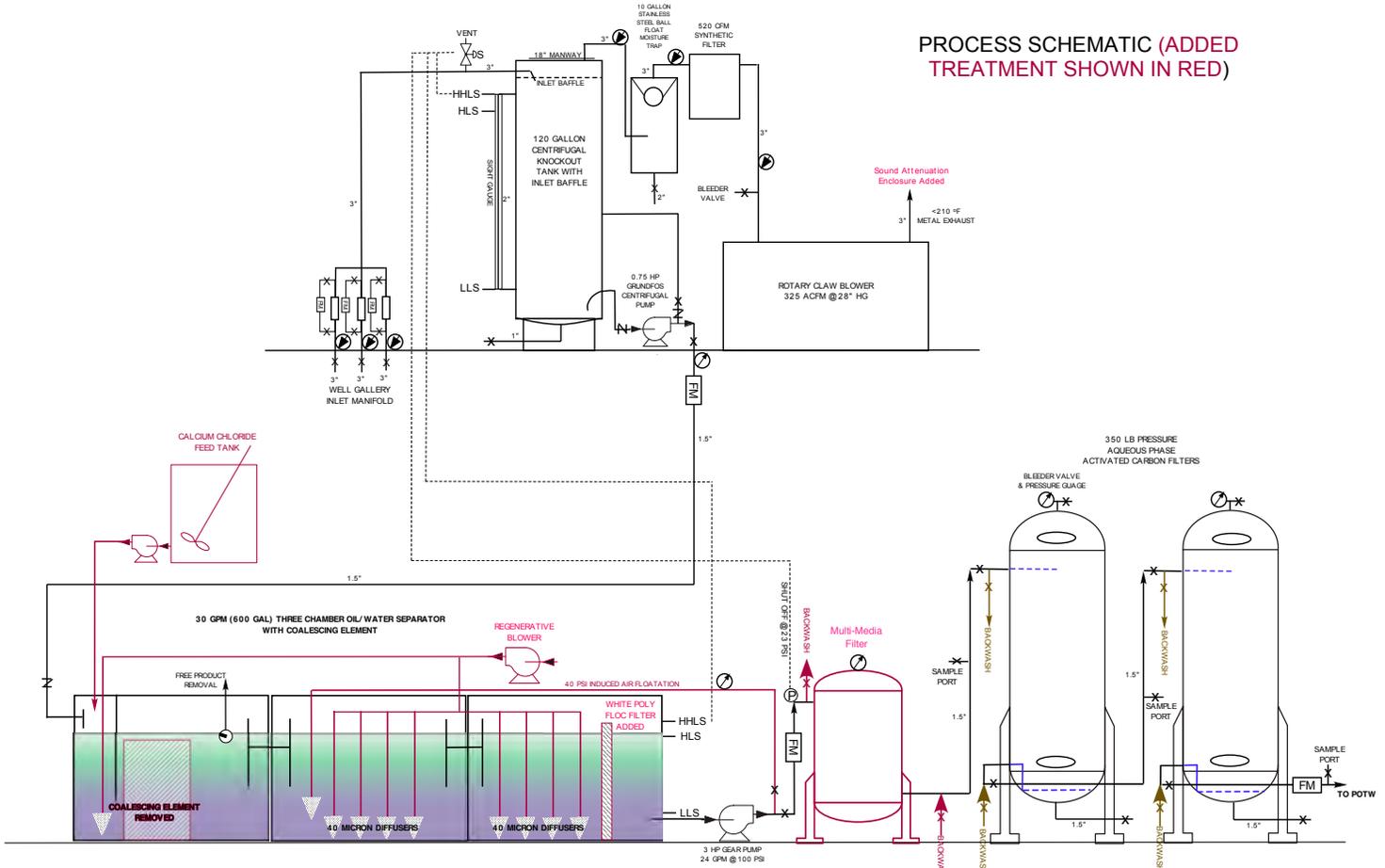


Iron Bacteria Separated from Fuel by DAF and CaCl<sub>2</sub> Flocculation



HC-2000 Injection into Extraction Wells

PROCESS SCHEMATIC (ADDED TREATMENT SHOWN IN RED)



48.44% Free Product Reduction In Extraction Wells after Four (4) Years of Dual-Phase Extraction

92.63% Reduction of Remaining Free Product with Seven (7) HC-2000 Injections during Final Year of Treatment