



## Evaporative Desorption Treatment White Paper

For the purposes of determining treatment feasibility for soil contaminated with naphtha-range petroleum hydrocarbons (C-10 through C-32), a scaled down model of the Evaporative Desorption Treatment Unit was used in a pilot test. A volume of soil, representative of the naphtha-range petroleum hydrocarbon contamination, was collected for treatment. Representative soil samples of the contaminated soil were also collected and analyzed to characterize the contamination before and after treatment.

The pilot test vessel was designed to allow placement of a soil container measuring 10" x 10" x 10". The heating element was sized to provide the same BTU delivery rate per unit volume of soil as the full scale Evaporative Desorption Treatment Unit. Air was drawn in through a bed of activated alumina for desiccation and through an electric heating element, which heated the air to 900°F. Air temperature was measured and monitored at the outlet of the heating element during the pilot treatment operation. The vapor extraction line was monitored for flow rate, temperature and hydrocarbon concentration.



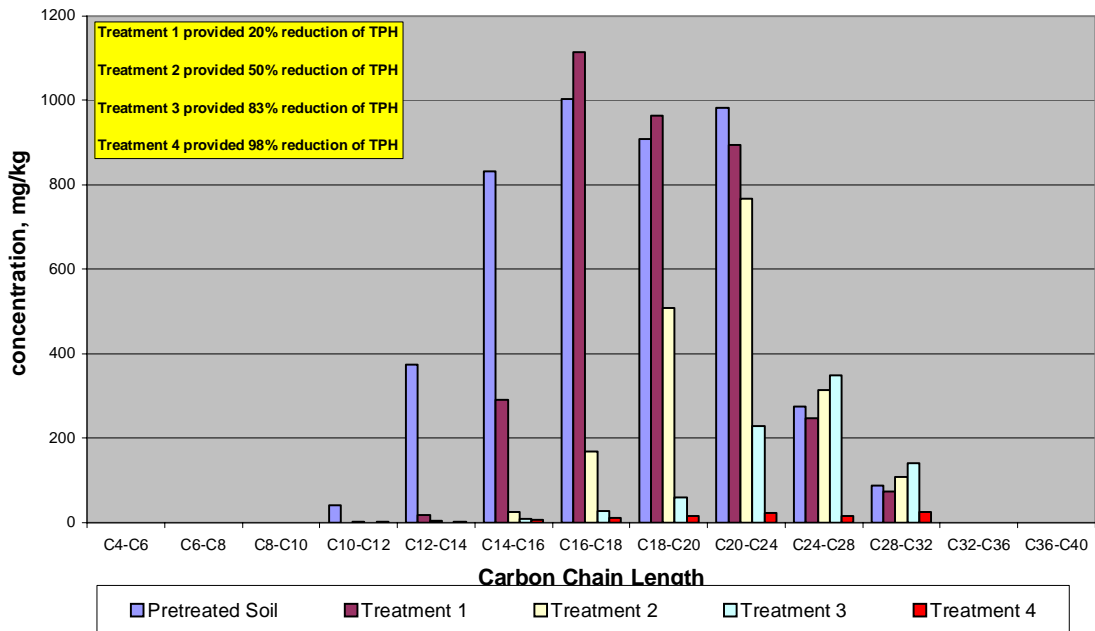
The pilot test consisted of four, separate soil treatment operations. The purpose of four treatment operations was to develop the relationship of total BTU delivery to the soil versus level of petroleum hydrocarbon removal.

### Results

The analysis of the pre-treatment and post-treatment samples characterized the hydrocarbon contamination through reporting the concentration found within specific carbon chain length ranges. This characterization provided an insight as to the function and capability of the Evaporative Desorption Treatment Unit.

The results of the pre- and post-treatment samples are presented in Figure 1.

## Soil Treatment Pilot Test Naphtha-Range Petroleum Hydrocarbon Contamination



**Figure 1.**

As can be seen in Figure 1, hydrocarbons are removed in a sequential manner, in order of carbon chain length. Longer carbon chains lengths require a higher total BTU delivery requirement. Through pilot testing, it is possible to determine the specific level of petroleum hydrocarbon removal that can be reliably achieved in full-scale practice.