

ADT Environmental Solutions Case Study

Togiak Fisheries Alaska, TPH Clean Up



Togiak Fisheries is a remote fish processing facility located at the confluence of the Togiak River and the Twin Hills River in Togiak Bay, Alaska. Togiak Bay, Alaska is located where northwest Bristol Bay and the Bering Sea meet. Brady Environmental, Inc. performed a site investigation and cleanup at the site. The site cleanup consisted of excavation of diesel and gasoline contaminated soils and onsite thermal treatment.

Gasoline and diesel range hydrocarbons leaked from an onsite tank farm and from underground dispensing lines.



Contaminated soils were removed during low tidal events to take advantage of the natural dewatering of the contaminant zone. The site contained free-floating hydrocarbons that discharged to surface water. The spill was discovered when a beach caught fire.

The hydrocarbons were removed through a hydrocarbon recovery system. Soil temperatures in the contaminant zone ranged from freezing to 40 degrees, which prevented bioremediation from occurring. Given the volume of impacted soil, and a short construction season, thermal treatment of the excavated soil was the most cost effective option.

Each cell was surveyed prior to construction.

Strict survey controls were maintained throughout the construction. The sub-base and pad excavation was inspected by an engineer prior to placement of the liners.



This photo shows the final preparations before liner installation.



The photo above shows two soil storage pads in the foreground. One pad is complete, while the other liner awaits fill material. Each pad has a sump to collect and treat leachate. Thermal treatment units are located in the background of the photo.



This photo shows two soil oven units. The unit in the foreground is in operation, while the unit in the background is being unloaded. No emissions have been an issue during active treatment.



The photo above depicts a soil oven in the open position after the soil has been treated. This facility has the capability of treating approximately 170 tons of wet soil per day. Soil moisture content in the Togiak soils range from 20 to 30%. The soil ovens can be sized for larger capacities.

Example Treatability

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.

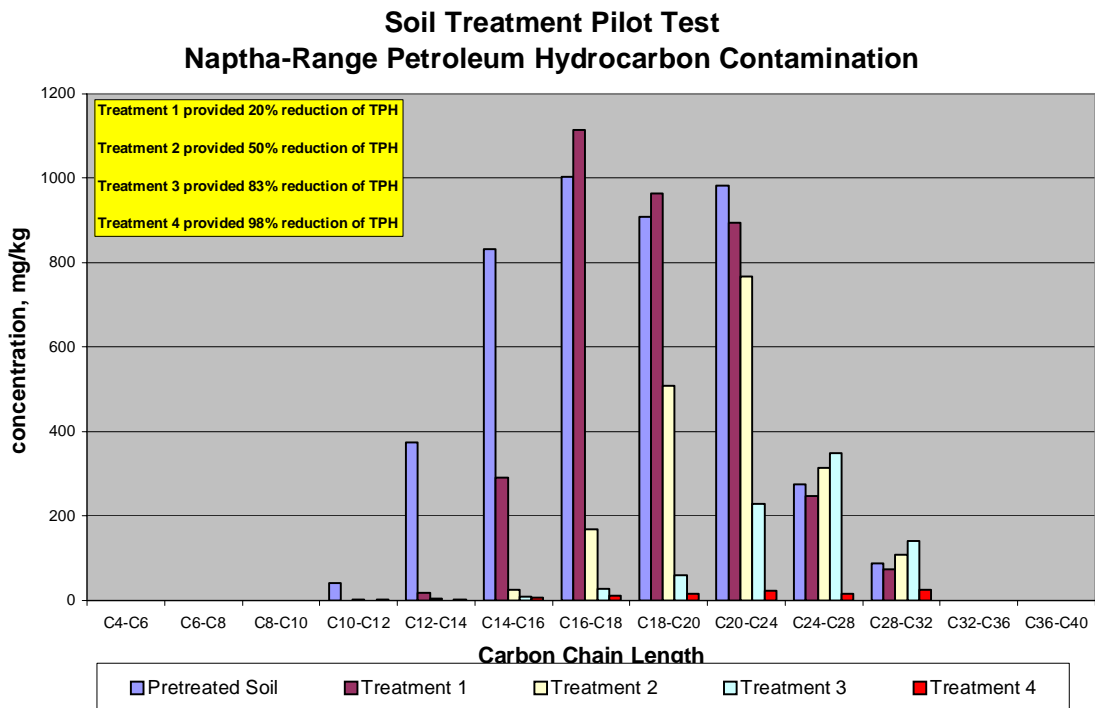


Figure 1.

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.