

**OS20 - Oil Sludge to Oil  
Treatment System for Oil Sludge,  
Drill Cuttings & Tank Cleaning  
Utilizing Shearforce Patented Technologies**

**Presented by  
Shearforce Ltd. Co.  
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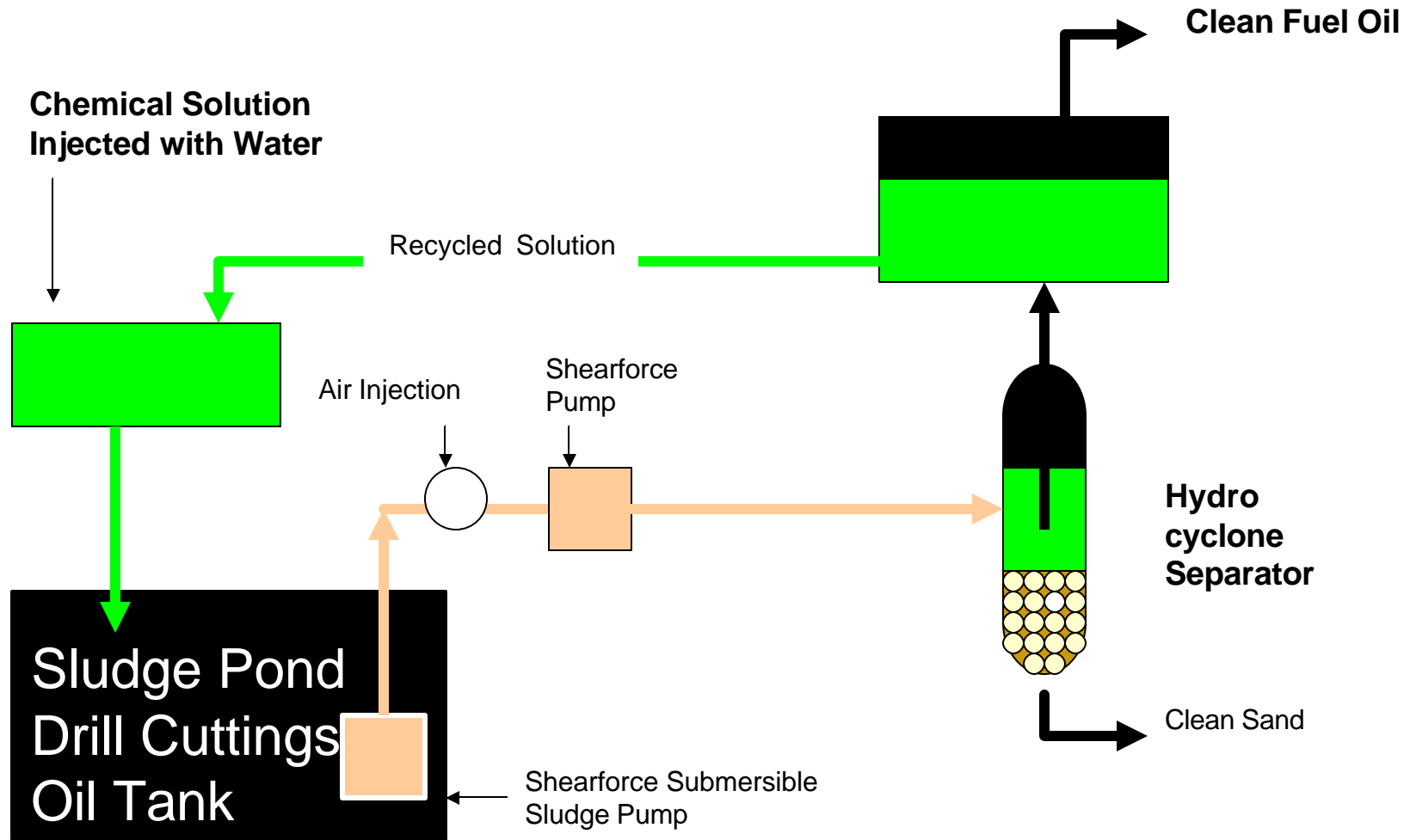
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## Typical Sludge Pits...the Problem



# Shearforce Process...the Solution



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## Shearforce Pumps – w/ Patented Shearforce Rotors

### Patented “Shearforce” Rotors

Patent No. US 6,752,597 B2



Shearforce Vane Less  
Submersible Pump

Shearforce rotors do not have vanes and thus have specific advantages over conventional impellers and are better suited for certain applications.

These applications include entrained gas (air induced fluids), high viscosity fluids and fluids with high solid content.

The rotor utilizes the fluid viscosity to generate the necessary forces required to sustain a pressure differential and corresponding flow.

This pumping action prevents fluids such as oil from emulsifying.

**Shearforce Ltd. Co.**  
Dallas, Texas

## Shearforce Sludge Processing



**The Problem:** Crude oil tank bottoms contain settled inorganic particles which create a very tacky sludge at the bottom of storage tanks or when placed into sludge pits. The inorganics and crude are tightly bound throughout the sludge.

This makes for a very unpumpable waste that is difficult to remove from the tank or pit. In addition, conventional methods for removal, recovery, and disposal are expensive when all costs are taken into consideration.

The use of SFACL (asphalt crude liquefier) liquefies asphaltenes and paraffin oil without the need of large amounts of equipment or personnel. This process turns the sludge into a pumpable and sellable commodity.



**The Problem:** The soil around well heads and Drill Cuttings have properties similar to asphalted material.

These hydrocarbon contaminated materials can be subjected to in situ remediation using SF1000, a synergistic blend of highly biodegradable compounds.

For off-shore drilling, this process eliminates the need to transport the Drill Cuttings to an onshore thermal desorption process.





**The Solution:** The solution is to inject an all-natural SFACL biodegradable solvent which is allowed to penetrate the crude over a 24 hour period. Once the asphaltic crude is liquefied, the crude is pumped to a skid tank for screening where it is stored for off-site transportation.

**The Application:** The top picture shows the Shearforce Conditioning Process of spraying the chemical solution into a crude sludge at a very low pressure. This physical application requires very simple equipment without high pressure applications eliminating potential danger to the operating personnel.

**The Effect:** The lower picture shows the liquefying of the sludge. This application is designed to create a solids suspended slurry or a very pumpable sludge that will not stick to the interior of hoses or downstream containment once it is removed from a tank.



**The Result:** The now pump able liquid recycled crude is pumped from the pit into a skid tank for screening of small debris. Sludge pits can be cleaned at a rate of 300 m<sup>3</sup> per day.

The crude is stored in skid tanks until offsite transportation is arranged.

The recycled crude has similar characteristics to number 6 fuel oil with a flash point of 136 degree Fahrenheit.

This crude can be blended with 5% diesel fuel allowing the product to be stored for long periods of time.







**Land Bioremediation:** After the heavy sludge has been removed from the pit, a second chemical SF-1000 is sprayed into the the contaminated soil to further breakdown and reduce the crude to microscopic particles providing immediate food source for the indigenous bacteria when tilled into the soil.

A Track hoe is used to rack in and mix the hydrocarbon contaminated burns with the oily pit sludge. The loose debris is placed into the pit for treatment as compose material.

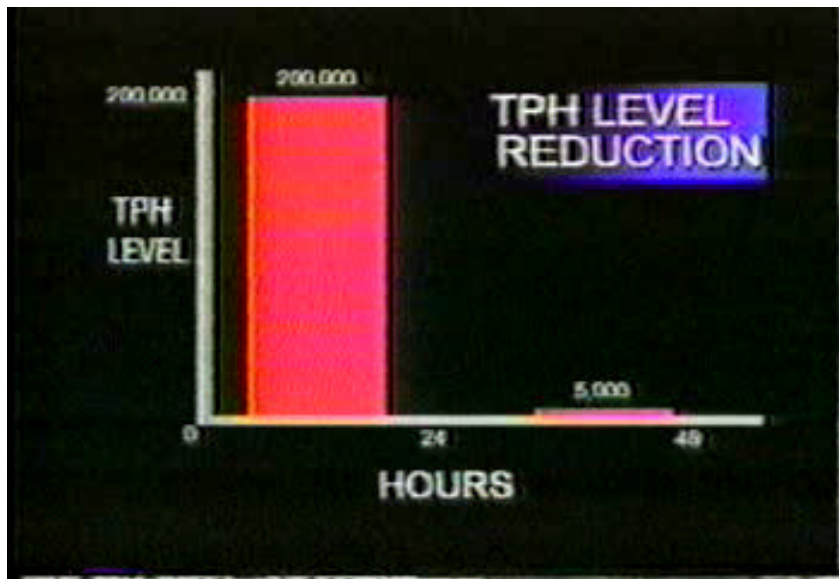
Soil samples are collected by a grid sampling method for an on site TPH analysis.





**The Result:** . Fresh soil is used from the surrounding area for stabilization material as well as additional source of indigenous bacteria. This process produces optimum condition for natural bioremediation.

The TPH level is dramatically reduced to acceptable levels with 24 hours. The land is then suitable for farming or other use.



## Pit Liners for oilfield drilling & industrial applications.



### Typical Pit Liner Applications:

- Oilfield Reserve Pits
- Remediation Pads
- Salt Water Disposal Pits
- Wastewater Lagoons
- Oilfield Frac Pits
- Drilling Pad Liners
- Sludge Storage Pits

20 mil Medium or High Density  
Polyethylene..One Piece Size 50,176 Sq. Ft.

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Ft.