

'OiliVorous'

An Environmentally Benign Biotech Solution for Disposal of Petroleum Sludge

Introduction

Safe disposal of petroleum sludge in a cost-effective manner is a problem that the Oil Industry, particularly in India, has confronted for a long time. It is a serious issue with large stocks piling up in different refineries, pipeline and marketing installations. Incineration has traditionally been used by some of the sludge generators. However, this option is under close scrutiny by environmental agencies because the sludge contains heavy residues and sulfur, which causes air emissions.

Bioremediation: The Remedy

Bioremediation is an enzyme mediated oxidation process, like chemical oxidation, conducted by microbes. This capability of microbes can be harnessed by introducing the selected biological agents, usually bacteria and fungi into the contaminants and when their growth conditions are suitably optimised, they either eat up (mostly organic compounds), or assimilate them (heavy metals).

This is just like '**natural incineration**' and occurs at ambient conditions. This process when appropriately adapted, can biodegrade oily sludge and ultimate end products are carbon dioxide and biomass.

'OiliVorous': The Product

The commercial product, is a blend of microbes adsorbed on a naturally occurring biodegradable carrier matrix has been named 'OiliVorous' and is currently under trademark protection. Depending upon the compositional characteristics and source/

type of sludges to be treated, the variants of microbial mix are designated as '**OiliVorous-S**' for tank bottom sludge and '**OiliVorous- A**' for acidic sludge. The major attributes of the product are:

- It contains "Natural Isolates.
- Not Genetically Modified".
- Safer to handle, no disease causing organisms.
- Has excellent capability to degrade wide range of hydrocarbon contaminants including organosulfur compounds.

The technology has been widely used for treatment of oily sludge at various refinery locations and the application rate of OiliVorous-S/ Acidic consortium, the biodegradation profile, the requirement of tilling, irrigation and nutrient application, cost of treatment of sludge and ecological safety of the process has been well established. In addition, a large volume of valuable data was generated for future applications.

Benefits

- This technology not only offers a solution to the problem of oily sludge generation, it is also being taken up now in a big way to bioremediate contaminated soil, tackle oil spills on land and also to dispose off large inventory of historically accumulated sludge in both upstream and downstream sectors of oil industry.
- The cost effectiveness of this technology provides much sought after solution to the problem of historically accumulated

sludge not only in India but also overseas. Bioremediation, offers immense potential for hazardous waste disposal and for remediation of contaminated land not only in the hydrocarbon industry, other chemical industries can also benefit from it. This technology can therefore be extended to find solutions to other industries also.

Potential Application Areas

OliVorous-S can be effectively employed for disposal of oily sludge generated at:

- Oil refineries for crude oil tank bottom sludge.
- Marketing installations for product storage tank sludge.
- Pipeline installations.
- Drill cuttings and oil spills at oil exploration sites.

Commercialization

This material is now regularly being used for commercial applications at refineries, marketing terminals, and pipelines and oil exploration and production sites.

Some of the commercial activities carried out are:

- Treatment of 3000 MT of oily sludges conducted at IndianOil's Mathura Refinery.
- Treatment of 3000 MT of low oil containing sludge was conducted at IndianOil's Barauni Refinery.
- Treatment of 3000 MT of acidic sludge carried out at IndianOil's Digboi Refinery.



Oily Sludge



OiliVorous-S in bags



Reclamation of oil spill site