

BiOWiSH® REMEDIATE

Oil-Based Drill Cutting Waste, Escondido Resources II, Texas, USA

Background

Drill cuttings are a combination of soil, rock and drilling fluids generated during the drilling process as the drill bit advances through rock or soil. These components mix with the drilling fluid which is used to facilitate the drilling process by suspending cuttings, controlling pressure, stabilizing exposed rock, providing buoyancy and cooling and lubricating the drill bit. Drilling fluids can be water, oil or synthetic-based and each composition provides a different solution based on the geological composition of the well. When oil-based mud is used, the drill cuttings are saturated with diesel and related hydrocarbons that must be disposed of as drilling waste material.

Currently, drilling operators and their investors incur significant costs to handle and manage oil-based drill cuttings. Additionally, under current EPA and various state regulations, these parties are indefinitely liable for all potential environmental risks associated with the material.

BiOWiSH® REMEDIATE, in combination with our approved regulatory process for remediation of oil based drill cuttings, provides a cost-effective solution for drilling operators to manage environmental risk and break the chain of liability while demonstrating the highest level of environmental stewardship.



Rig setup: raw cuttings from shakers, dryer and BiOWiSH® treatment totes

Opportunity

Published numbers for the state of Texas show 1,735 active drilling permits issued for October 2013 and a total count of 21,432 oil & gas wells drilled during January-September 2013. The Eagle Ford shale formation in South Texas and the West Texas Permian basin are largely responsible for the surge in drilling operations in recent years. Generally speaking, each well generates between 1000 and 2000 barrels (bbl) of oil-saturated drill cuttings waste material.

Drilling operators actively manage their costs and are always interested in identifying opportunities to reduce costs and deliver competitive advantages. Escondido Resources II LLC (ERII) is one of several drilling operators in the Eagle

BiOWiSH® REMEDiate



- Reduces the cost of managing hydrocarbon containing waste
- Effective across a wide range of environmental conditions
- Works on-site with current drilling practices
- Improves environmental outcomes
- 100% natural, non-toxic and free of harmful chemicals

Available Sizes

- 2.2lb/1kg
- 11lb/5kg
- 22lb/10kg

Ford shale and surrounding formations in South Texas. In an effort to better manage waste, reduce costs and strengthen their commitment to environmental responsibility, ERII implemented this new waste management protocol using BiOWiSH® REMEDIATE.

Objective

A waste management protocol consisting of a multi-phase proprietary remediation process incorporating BiOWiSH® REMEDIATE was developed for Texas in partnership with Eco Environmental Services (EES) and through an ongoing research effort between California Polytechnic State University and BiOWiSH Technologies. This process delivers a reduction in TPH (Total Petroleum Hydrocarbons) levels of oil based drill cuttings from off-the-rig shakers to well below 100 ppm. EES has received permission through the Texas Railroad Commission (the RRC oversees all drilling in the state of Texas) to recycle and reuse the BiOWiSH®-remediated drill cutting waste material. Rather than dumping the cuttings as drilling waste, the BiOWiSH®-remediated waste material is tested and qualified as a high quality and beneficial material for use on lease roads, pad sites and county roads. As part of EES's permitting, the reuse of the BiOWiSH® remediated and reclassified flexible base material eliminates the environmental liabilities associated with waste previously classified as oilfield waste material.



Treating centrifuge cuttings with BiOWiSH®

Solution

In mid-2013 EES established a working alliance to provide the remediation and recycling of drilling waste as part of a closed-loop mud fluid recovery system for drilling operators. ERII was the first drilling operator to implement this natural biological treatment, allowing them to minimize waste generation associated with oil based drilling. By incorporating BiOWiSH® REMEDIATE with EES's permitted remediation process on a closed-loop mud system, ERII has bio-remediated and recycled 100% of their water and oil-based solid waste from 9 wells in South Texas, totaling 14,962 bbl. This effective and environmentally safe way of handling solid drilling waste materials is now considered by ERII to be a cost-effective solution, and is now their preferred method of handling drilling waste. The most recent wells have achieved complete bio-remediation of their waste material within 5 days of reaching Total Depth (TD). All recycled material must be tested by an independent laboratory, and is available within 15 days. ERII has recognized a reduction in trucking costs and disposal fees and an increase in value from usable road base material.

Results

Results from 9 well sites show successful remediation of hydrocarbons within 30 days to levels well below the 100ppm permit requirements

Eagle Ford Shale, TX				
Site	Waste Volume (bbl)	Initial Oil Content (ooc %)	Treating Time (days; includes drilling time)	Final Oil Content (ppm)
1	1881	16	26	2.93
2	1856	15	30	5.54
3	1952	14	24	2.75
4	1663	16	26	2.64
5	1734	15	21	5.36
6	1566	14	25	5.20
7	1631	15	16	5.61
8	1505	14	9	5.08
9	1474	14	9	4.36

OOC% is an estimate obtained from on-site retort testing. Final sample TPH ppm are certified by an independent lab. Treatment timeline includes days of drilling since the treatment plan begins with first cuttings generated by rig.



Treatment of dryer cuttings

Conclusion

BiOWISH® REMEDIATE incorporates a unique blend of proprietary microorganisms, enzymes, and cofactors that create powerful composite biocatalysts to speed up the breakdown of organic matter. This specific formulation is designed to enhance digestion rates and eliminate hydrocarbon waste over a broad range of environmental

conditions present in the oil and gas drilling industry. In addition, BiOWiSH® is all-natural and safe for people and the environment.

By using BiOWiSH® REMEDIATE, EES was able to implement a multi-stage proprietary and permitted process, which has allowed ERII to manage drilling waste expenses and reduce environmental liabilities while using an on-site, eco-friendly solution to eliminate oil and water-based solid drilling waste.

Additional benefits recognized by ERII include:

- An estimated average reduction of 28 trucks per well removed from lease and county roads
- Elimination of disposal fees and associated trucking on 14,962 bbl of drilling waste
- An estimated reduction of ~2.7 tons in CO² emissions
- On-site recycling of the waste material for use as road base material
- Elimination of all future environmental liabilities as a result of the Texas RRC-permitted process
- No change required to ERII current drilling process



BiOWiSH® is a registered trademark of BiOWiSH Technologies International, Inc.

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