CASE STUDY

HALLIBURTON

Oman

Bioremediation achieves <1% total petroleum hydrocarbons in OBM cutting treatment, saves up to $15,000 per well

Mobile vertical cuttings dryer and in-situ chemical treatment eliminate cuttings haul-off process, decrease CO_2 emissions by up to 10.7M gCO_2e

CHALLENGE

- Treat OBM cuttings to below <1% oil-on cuttings (OOC)
- HSE challenges associated with trucking of non-aqueous fluids (NAF) cuttings
- Distance between rig site and waste yard

SOLUTION

- Used the mobile vertical cuttings dryer to reduce TPH levels to below 5%, followed by in-situ chemical treatment to achieve TPH levels of less than 1%

RESULT

- Reduced TPH level for treated cuttings to 0.6% in eight weeks
- Eliminated cuttings haul-off with the maximization of NAF recovery in the MVCD process and final in-situ treatment

The mobile vertical cuttings dyer is used to treat contaminated cuttings.

Overview

A major operator in Oman drilled two vertical gas wells in the central onshore region as part of a deep gas exploration project. One section of these wells required non-aqueous drilling fluids (NAF) due to formation-related challenges. According to the country's environmental regulations, oil-based mud (OBM) cuttings must be treated to less than 1% total petroleum hydrocarbons (TPH) before disposal. The drilled OBM cuttings were collected and stored in a centralized facility outside of the drilling site.

The Baroid Separation Solutions team in Oman provided an in-situ chemical treatment and a mobile vertical cuttings dryer (MVCD) to treat the contaminated cuttings. The in-situ chemical treatment (ISCT) involves a blend of surfactants designed to emulsify the hydrocarbons and make them more accessible for local microbes to consume.

The MVCD technology features a trailer-mounted system that contains a cuttings dryer and processing centrifuge. It was selected to help deliver economic and health, safety, and environmental (HSE) benefits for the project.

CASE STUDY

Challenge

According to Oman's health and environmental regulations, all discarded oil-based mud (OBM) cuttings from drilling operations must be treated to reduce TPH to less than 1%. While this can be accomplished with thermal treatment, the process involves several challenges, such as increased health, safety, and environmental risks with the transportation of wet cuttings to a thermal facility, higher CO_2 emissions, and elevated treatment costs per ton.

The primary challenge was to identify a cost-effective, onsite method to eliminate the need for trucks and their associated diesel consumption. In addition, the operator aimed to reduce the risk of spills with the transportation between the well site and waste yard.

Solution

Halliburton proposed an innovative in-situ chemical treatment and MVCD system to address the operator's concerns. The MVCD system can reduce oil retention on cuttings (OOC) to less than 5%. The processed cuttings become compacted and reduce the volume hauled from the rig site for final disposal. A unique bioremediation technology was used to reduce oil retention on cuttings to less than 1% TPH.

Result

Approximately 85 m³ of drilled cuttings were generated for well #1 while drilling the 17 ½-in. interval with a drilled length of 527 meters. The total recovered ENVIROMUL™ (OBM) mud recovered from the MVCD system was 23 m³ and returned to the liquid mud plant with acceptable properties.

Transportation of wet cuttings to the waste management yard was eliminated and all treated cuttings (with less than 5% TPH after MVCD) were disposed of in an on-site pit for further in-situ treatment. The in-situ bioremediation treatment was completed in less than eight weeks, and resulted in a final lab result of 0.6% OOC. This level is below the country's HSE legislative requirements.

The treated OBM cuttings were approved by the local authorities, and the drilling site was cleaned and the waste pit was buried.

1. Master waste pit before treatment.
2. Soil added from the desert to the waste pit.
3. In-situ treatment added.
4. Mixing the treatment in the waste pit.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

halliburton.com

HALLIBURTON