

Baroid's Waste Management Service Helps Operator Save \$1.39M and Ensure Environmental Compliance

BAROID DRILLING WASTE MANAGEMENT SERVICE HELPED OPERATOR NET \$1.39M IN BASE OIL REUSE SAVINGS AND ENSURE ENVIRONMENTAL COMPLIANCE IN REMOTE LAND OPERATION

NORTHWEST KAZAKHSTAN

CHALLENGE

- » To improve drilling performance, far from the mud stockpoints under harsh climatic conditions threatened to impede logistics.
- » Deploy cuttings treatment technology that could keep pace with continuous drilling operations on three rigs, each producing 1,000 m³ of oil-based cuttings per well
- » All cuttings had to meet the regulated specification of 1.0% (w/w) oil on cuttings at the end of the process

SOLUTION

Baroid Drilling Waste Management service personnel provided a comprehensive engineered solution:

- » Baroid thermo-mechanical Cuttings Cleaner (TCC)

RESULTS

- » The recovery of 1,110 m³ base oil resulted in total net profit to operator of over \$1,390,000 USD
- » This volume of recovered oil represents 16% of the overall base oil used in this project, significantly reducing the logistical issues related to maintaining the oil-based system and maximizing drilling efficiencies in this remote location

CHALLENGE

To improve drilling performance, a major operator switched from water-based mud to a low-toxicity oil-based system. However, the remote drill sites were located far from the mud stock points and harsh climatic conditions threatened to impede logistics. Most challenging of all was the need to deploy cuttings treatment technology that could keep pace with continuous drilling operations on three rigs, each producing 1,000 m³ of oil-based cuttings per well. All cuttings had to meet the regulated specification of 1.0% (w/w) oil on cuttings at the end of the process. Additionally, strict environmental regulations imposed by the Government of the Republic of Kazakhstan required deployment of Best Available Technology (BAT) for treatment of oil-based drill cuttings, making this an ideal application for the Baroid thermo-mechanical Cuttings Cleaner (TCC).

To address these challenges, the operator's waste management strategy needed revision to help ensure operations continued in a safe and environmentally acceptable manner. Major objectives included making rig site modifications, optimizing transfer and transportation practices, installing new mixing and storage capacity at the liquid mud plant and establishing reliable methods for base oil recovery with 100% reuse.

SOLUTION

Baroid Drilling Waste Management service personnel provided a comprehensive engineered solution to expedite the change in mud systems safely and economically. Key components of the solution are shown below, with the thermo-mechanical Cuttings Cleaner as the centerpiece of the operation.

- » Detailed rig audits to identify needed modifications
- » Waste management personnel on all rigs to ensure the transition from water-based to oil-based fluid was accomplished smoothly
- » New storage and mud reconditioning capabilities to manage cuttings and expedite reuse of recovered base oil
- » Dedicated cuttings skips and trucks to prevent delays in handling that could slow or halt drilling operations
- » Dedicated vacuum trucks for oil-based mud transport
- » Engineered oily water treatment package to minimize pollution risk

Thermo-mechanical Cuttings Cleaner – A key factor in selecting the best cuttings treatment technology is the Total Petroleum Hydrocarbon (TPH) level permitted to remain on the cuttings. The goal is to produce oil-free (ultra-low TPH) solids for disposal through thermal

desorption. The oil and water is evaporated from the cuttings and the vapor is condensed in stages recovering clean oil for reuse in drilling fluid.

The TCC system uses a process mill which contains a rotating shaker with a series of hammer arms to generate friction. The use of friction efficiently generates heat directly in the cuttings bed without the use of flame or indirect sources. The temperatures associated with the process (250°C to 300°C) and short retention time (a few seconds) reduce the risk of fracturing the base oil, which results in recovery of a consistent high quality oil comparable to the original product.

RESULT

Over a nine-month period, cuttings processed with the TCC unit have shown average TPH levels of 2,400 ppm. The permitted limit imposed by the Government of the Republic of Kazakhstan is 10,000 ppm. The TCC process allows the operator to carry out safe and compliant disposal of all treated cuttings at the dedicated landfill site.

Since making the change to oil-based mud in mid-2008, the operation has recorded zero spills at the rig site or during the transport of over 9,000 m³ of contaminated cuttings across the 75-km distance to the central treatment site. A significant volume of base oil has been recovered for reuse, creating savings in fluid and disposal costs.

Additionally, since the start of oil-based system implementation, all three rigs have sustained continuous drilling operations with no downtime related to cuttings handling or oil-based mud supply.

In nine months, Baroid Drilling Waste Management service personnel assigned to this project have treated over 8,100 m³ of oil-based drill cuttings. The recovery of 1,110 m³ base oil resulted in total net profit to operator of over \$1,390,000 USD. This volume of recovered oil represents 16% of the overall base oil used in this project, significantly reducing the logistical issues related to maintaining the oil-based system and maximizing drilling efficiencies in this remote location.

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