NOV pumping system facilitates successful drill waste management for environmentally sensitive Kazakhstan operation

Equipment supports effective processing solution for oil-based-mud contaminated drill cuttings

Background

Our client provides drilling fluids and services to energy companies around the world and is a global leader in total fluids management services. The fully contained closed-loop system in this project used an NOV pump for handling oil-based-mud contaminated drill cuttings, which provided an environmentally sound alternative to the traditional open system that uses skip-and-tip methods. This allowed the operation to be carried out in a truly zero discharge manner, which was essential in the 10-m deep shallow water. The project was located in the beluga sturgeon's breeding ground, which produces Kazakhstan's largest export—caviar. Due to this environmentally sensitive area, the offshore discharge of any oil-based cuttings or fluids is prohibited.

Case study facts

Location: Kazakhstan

Installation type: Barge emptying unit

Product: Oil-based-mud contaminated drill cuttings

Results/value

As a single-source supplier, NOV manufactured both core products

- Simplified process – only one vendor to deal with
- No product integration issues

Customer trailed the units in Scotland and Oklahoma

- Provided peace of mind once the equipment was installed at site
- Integrity of the cuttings was maintained due to the smooth pumping action

Customer-focused solutions

- Pumps and munchers were adapted to suit site-specific design requirements, in this case this was the use of hydraulic motors

Background (cont)

The system was developed for an international operating company that was developing prospects in the Caspian Sea off the coast of Kazakhstan. The barge pump unit and high-pressure pump transferred cuttings delivered by barge from drilling operations in the Caspian Sea to an onshore supply base and treatment facility. Within the barge itself, settled drill cuttings were homogenized to obtain the desired consistency of cuttings slurry. By design, the system would condition the cuttings and transfer them from the barge to a holding tank in preparation for pumping to a holding corral at the treatment plant.

The barge pump unit was mounted vertically on the end of an excavator, allowing the operator to maneuver the equipment within the barge and ensure all the cuttings slurry is collected and transferred to the holding tank. The barge pump unit comprised a single-stage, 87-psi (6-bar) E Range progressing cavity pump and a pair of low-speed, mechanical agitators that slurrified the cuttings. The suction side of the pump was fitted with a Series 'A' Muncher, which is a twin-shaft, low-speed, high-torque grinder that protects the pump and pipeline from damage by foreign objects discarded into the cuttings. A second high-pressure E Range pump operated at pressures up to 580 psi (40 bar) and delivered the slurry 656 ft (200 m) from the holding tank to a holding corral at the thermal processing unit at a rate of 220 GPM (50 m³/h). The system required a careful selection of construction materials to ensure compatibility with the pumped media and the operating environment.

Prior to the Kazakhstan operation, the pump system completed successful trials in both Scotland and Oklahoma. Parallel tests were carried out on numerous pump technologies to compare performance abilities, and the NOV equipment proved to be the optimum solution. The NOV pump system was able to ensure high transfer rates without sacrificing a reliable, smooth, gentle pumping action to maintain the cuttings integrity—these were especially valuable features when compared to the other pumps tested.

Case study facts

Muncher: SA210 Series 'A' Muncher

Capacity: 220 GPM (50 m³/h)

Drive: Hydraulically driven using marinized hydraulic motor

Rotational speed 65 RPM – hydraulic oil feed rate 4 gal/min (16.5 l/min) at 2,465 psi (170 bar)

Pump: Industrial pump

Capacity: 220 GPM (50 m³/h)

Drive: Hydraulically driven using marinized hydraulic motor

Rotational speed 200 to 250 RPM – hydraulic oil feed rate 15 to 20 gal/min (55 to 75 l/min) at 2,465 psi (170 bar)

Pressure: Up to 90 psi (6 bar)

Installation type: Slurrification unit

Pump: Industrial pump

Capacity: 220 GPM (50 m³/h)

Pressure: Up to 550 psi (36 bar)

Drive: Electrically driven via 110-kW motor de-rated to 86 kW for use with an inverter

Pump: Industrial pump

Capacity: 264 gal/h (1 m³/h)

Pressure: Up to 700 psi (48 bar)

Drive: Electrically driven via 4-kW motor