

Smaller mud pump achieves near zero pulsation

A MUD PUMP that is two-thirds the weight and up to one-third smaller than a typical mud pump is being tested in Norway before a production model will be installed on a rig in the field in 2003.

National Oilwell's Hex Pump 150, a 1,500 HP unit, has been under development for the past two years. The company also plans to offer a 2,400 HP version as well.

The Hex Pump utilizes six pistons/plungers arranged vertically in a cylinder-shaped pump assembly.

A specially-profiled cam rotates above the pistons/plungers to produce the pumping action with specific timing to significantly minimize output pulsation compared with traditional pumps.

The cam operation is driven by two AC motors and produces a more constant piston/plunger speed and flow rate, resulting in longer life of the valves and mechanical components, according to the company.

Due to the AC drive flexibility, the pump can perform both high pressure or high flow operation without changing the liner size.

In addition to the pump offering increased performance, efficiency and versatility due to its size and output, the unit also produces nearly zero pulsation compared with a mud pump typically found on rigs.

"The pump mechanically has zero pulsation," said **Jason Whyte**, New Product Implementation Manager for National Oilwell.

An advantage of zero pulsation relates to downhole measurements. A lot of tools use measurement while drilling (MWD) that relies on mud pulse telemetry to send signals back to the surface.

The tools produce a pulse in the mud that travels up the mud column to the surface.

Any pulsation created by mud pumps acts as noise or interference on the pulses being transmitted through the mud column.

"Because of the slight compressibility of the mud, we do get small pulses in the flow but we achieve about 92% less pulsation compared with a Triplex pump."

That is achievable due to the mechan-

ism. "Theoretically it provides 50% more pumping capability in the same size pump room."

While the final cost has yet to be determined, it is anticipated it will be between 20%-25% more than a Triplex pump, Mr Whyte noted.

This is partly due to more machined parts in the Hex Pump, according to Mr Whyte.

There are about the same number of moving parts and mechanical components as a Triplex pump but the cam is specially designed specifically for the Hex Pump and is produced at an outside facility rather than at National Oilwell.

There are also various other specialized components, Mr Whyte noted.

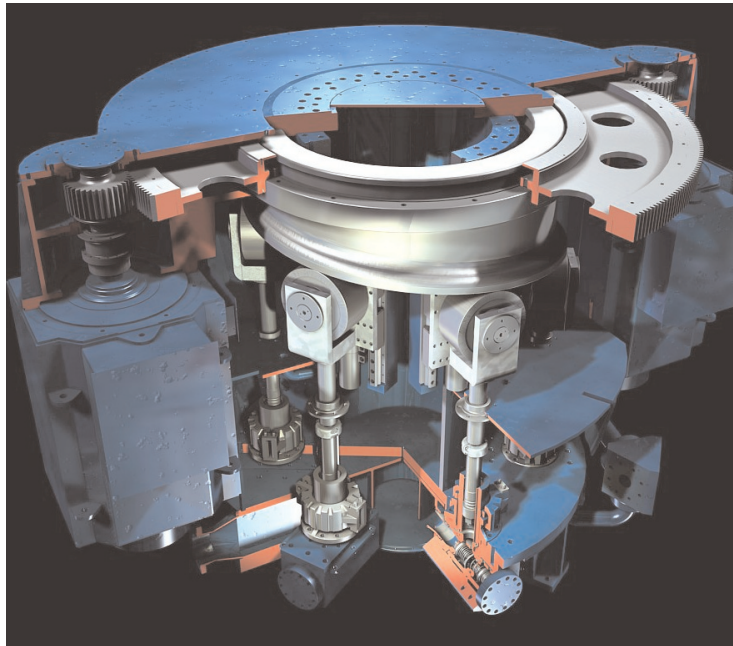
The 1,500 HP version and the still to come 2,400 HP version will be the same size physically.

The horsepower increase comes from upgrades such as larger capacity

A/C motors as well as some internal components that will be upgraded for the higher capacity. The pump's main structure will remain the same.

Other features of the Hex Pump include:

- More consistent plunger speed
- Reduced wear and maintenance
- Cartridge style valve system for easier maintenance
- Lower peak flow rate through valves
- Smaller fluid end components for easier handling
- AC motors to achieve either high pressure or high flow without changing liner size



National Oilwell's new design Hex Pump is undergoing testing in Norway before being installed on a rig in the field in 2003. The pump is two-thirds the weight and one-third smaller than a typical mud pump.

ical operation of the pump. There is a single overhead cam that rotates as it operates the cylinders in and out through the suction and discharge phases.

The way the phases are timed with each other, it achieves zero pulsation.

The cam's profile also helps result in zero pulsation. It is a specialized profile that helps reduce pulsation. National Oilwell has a patent pending on the cam.

The lighter weight and smaller size of the Hex Pump could enable rig upgrades where there is a fixed amount of space to install additional mud pumps.

"Because the shape of the Hex Pump is round," Mr Whyte said, "the space that