

# Contractors building state-of-the-art land rigs

**ONSHORE RIGS TEND** not to be as sophisticated as their offshore brethren. However, several drilling contractors have been building new land rigs that incorporate some of the latest technology that improve upon drilling efficiencies. This includes utilizing automated driller's cabins, pipehandling equipment and AC drive motors.

**Helmerich & Payne International Drilling Co** has the most ambitious newbuild program, but other contractors such as **Rowan Companies** and **Pioneer Drilling** are also building new units.

## H&P'S FLEXRIG

Helmerich & Payne has built 18 of the rigs dubbed FlexRig, including six first generation units (Flex 1) and 12 second generation rigs (Flex 2). The company's current newbuild program calls for 25 Flex 3 units to be built and delivered during 2002 and 2003.

Four of the 25 new Flex 3 rigs are already operating and the fifth unit was rigging up at mid-August.

The Flex 2 and Flex 3 rigs have an automated driller's cabin, and the latest generation will also include AC drive technology. AC technology expands the range of horsepower and RPM compared with DC motors. An additional advantage is that stall conditions can be sustained longer with AC motors compared with DC motors, when parking the pipe, for example.

Another enhancement of the Flex 3 rigs is a top drive that is integrated into the mast, eliminating rigging up and down when moving from location to location.

The average mobilization time for the flex rigs, according to H&P, is 2.4 days compared with 6.7 days for a conventional rig for a 40-mile move.

The Flex rigs have been more expensive to build over the different generations, but that is primarily due to enhancements made to the design. For example, Flex 1 rigs built in 1998 cost an average of \$6.7 million without a top drive.

Flex 2 rigs built in 2001 cost an average of \$8 million without a top drive but they do include a driller's cabin. Finally the

Flex 3 units are estimated to cost an average of \$10.5 million, including AC power, Driller's cabin and top drive.

Enhancements made to the Flex 3 units include a Varco TDS-11 top drive integrated into the mast to reduce cycle time and increase safety and reliability; variable frequency drive AC power for the top drive, drawworks and mud pumps; 750,000 lb hookload mast; Driller's console and cabin; an H&P-design BOP handling system that is integrated into the driller's cabin hydraulic system; mechanized rig floor pipehandling capability; and a provision to add a fourth engine and third mud pump.



**Pioneer Drilling's Rig 7 is working for Suemar Exploration & Production, LLC in Kleberg County, Texas. This was the first land rig to be powered with AC drive motors.**

An H&P-designed and patented round mud tank system provides improved mud handling and mixing efficiencies as well as improved cleaning operations compared to conventional square tanks. The round shape means personnel do not have to enter the tanks to clean out material that has settled, eliminating confined space entry issues.

Additionally, the tanks are elevated. Suctions on the bottoms of the tanks results in all of the mud to be accessible and useable. Also, displacing one mud

with another can be accomplished within 8-12 hours for the 750 barrel tank compared with up to 24 hours with a square tank, thus reducing flat time.

## PIONEER FIRST WITH AC

Pioneer Drilling was the first company to power a land rig in the US with AC drive motors, according to **William Stacy Locke**, Pioneer's President. Those units, Rig 7 and Rig 8, were ordered in May 2000, with the first unit delivered in August 2001 and Rig 8 delivered last March. The construction cost of Rig 7 was approximately \$7.5 million while Rig 8 cost about \$7.8 million.

The staggered delivery schedule allowed Pioneer to have the first rig in the field to work out any system problems before Rig 8 was delivered.

Pioneer presently has three rigs under construction, although none of them include AC drives. The reason is economics, Mr Locke said, not problems with AC drive equipment.

"We like the (AC) technology and we would probably add more AC drive rigs in the future," Mr Locke said, "but we can't justify the cost of building rigs at that level.

"Once you get over the \$8 million or \$9 million mark for those rigs it becomes a questionable return on investment.

"You need a real strong market for a longer period of time to make that kind of investment profitable for your shareholders," Mr Locke added.

"We want to continue to add premium quality equipment but we want to keep the cost below the \$7-\$8 million range," Mr Locke added. "The three rigs we're building today are all going to be under \$7 million."

Of the three rigs presently under construction, Rig 24 is scheduled for delivery this November with Rig 25 set for delivery in January 2003. Both are IDM units. Rig 26, ordered through Drilling Structures International (DSI), will be delivered this September.

Rig 26 will be delivered with a two-well contract. Rigs 24 and 25 are not yet contracted.

Rig 26, the DSI unit, is a prototype design, according to Mr Locke. It is a DSI-designed quick set substructure unit that was co-designed by Pioneer Drilling's COO Red West.

"The rig has a quick set substructure and a telescoping mast that is designed to assemble very quickly with a small footprint," Mr Locke said.

The three units under construction can move from one location to the next well site in about one-third the time of a conventional box on box rig, according to Mr Locke.

Additionally, the smaller footprint also saves the operator money due to a smaller rig site required.

Pioneer also is looking at additional fleet expansion. "If Rig 26 works like we think it is going to work," Mr Locke said, "we may order additional rigs from Drilling Structures."

Fleet expansion probably is still on the horizon even if additional DSI rigs aren't ordered.

"In terms of building rigs, we probably will plan on adding at least five rigs per year, either through a combination of internal growth like building or through acquisition of individual rigs."

## ROWAN'S LAND UNITS

Rowan Drilling recently completed the last of four new land rigs that were designed by the company. The 2,000 HP AC driven rigs are designed for quick moves between locations and are set up for high pressure, high temperature drilling. The rig features two 2,200 HP LEWCO mud pumps to handle high pressure drilling.

"The mast is in two "L" shaped pieces," said David Russell, Vice President of Rowan Drilling. "It is not taken apart."

The mast has a 1 million lb hookload capacity. The rig floor and substructure for an integrated drainage system for zero discharge of fluids, etc.

The rig breaks down into about 40 loads, and Rowan says they can mobilize from location to location in 4-5 days compared with conventional 2,000 HP rigs that can take up to 8-9 days.

The Rowan units, Rig 51, 52, 53 and 54, utilize conventional drilling equipment



All of the drilling operations can be monitored from the driller's cabin of Helmerich & Payne's Flex 3 rigs. These rigs also feature AC drive motors and an integrated top drive drilling system.

as Rowan prefers to stay away from automated Driller's cabins and other mechanized equipment, at least on its land rigs, for reliability purposes.

"They work fine offshore where there is a more permanent installation," Mr Russell said, "but on land with moving the rig and everything else, I think there is

going to be a lot of maintenance issues."

The rigs also utilize mud tanks with rounded bottoms for optimum mixing and cleanout.

There may also be additional new land rigs in Rowan's future. "We are looking toward building another series of rigs," Mr Russell said. "They have not been approved as yet but they are definitely on the radar screen."

Additionally, Rowan also is converting several of its existing mechanical rigs to AC drive.

The reason, Mr Russell notes, is that all of Rowan's electric rigs have been 100% utilized for some time. "The higher quality rigs are all doing well," Mr Russell said.

Four rigs are in the yard presently undergoing the conversion and are expected to be delivered by summer 2003. ■