

Both land and offshore rigs get extensive upgrades

HIGH LEVELS OF DRILLING activity have called for adding rigs to the active fleet and upgrading units to handle increasingly severe operations.

As examples, 2 upgrade projects are highlighted here.

GREY WOLF UPGRADES #558

After an extensive refurbishing, one of the industry's biggest land rigs was put back to work this year by **Grey Wolf Drilling Co.** Rig #558 is now drilling a well for **Burlington Resources** in Wyoming that is targeted to about 25,000 ft.



Recently refurbished Grey Wolf Drilling Co Rig #558 has the highest hook load capacity of any rig currently operating in the US. Photo by Miekko Mahi is courtesy of Grey Wolf.

"The rig is currently the largest rig in terms of hook load capacity running in the US," said **Ronnie E McBride**, Grey Wolf Senior Vice President, Domestic Operations. Built in the early 1980s, the rig was bought from **Murco Drilling** in 1997. Grey Wolf bought the entire company in 1998.

Formerly known as Rig 58, the rig had not drilled many wells, but it had been idle for a long time. So a "total refurbishing" began in late 2000 that included new power, new BOP, new top drive and new solids control equipment, among other components. A critical inspection was done on the mast and substructure and it was certified as like new.

"A key upgrade, was a new 27,000-ft, 5 7/8-in. high-tensile drill string," said Mr McBride. "Previously, the operator had to drill the top part of the hole with a

string of 6 3/8-in. drill pipe, then lay it down and pick up a 5-in. string to drill to TD." The 5 7/8-in. drill string, standard on Rig #558, makes it possible to avoid having to switch drill strings, while still providing the same flow characteristics as the 6 3/8-in.

This new string will offer considerable savings in well cost on these deep wells. Well plan on the current well calls for 20-in. casing at 1,500 ft; 14-in. casing set at about 14,800 ft; a 10 3/4-in. liner set at 20,300 ft and a tapered string of 7 3/4-in. and 10 3/4-in. casing set at approximately 23,300 ft. A 6 1/2-in. hole will then be drilled to TD.

The big rig's 156-ft mast and 40-ft substructure are rated for 2.5 million lb. A 4,000-hp **Dreco** drawworks does the hoisting and the mud system is built around three **National Oilwell** 1,700-hp mud pumps. The mud system has a 2,000 bbl capacity and five shakers. Four 3516TA **Caterpillar** engines power it all through a **Ross Hill SCR** system. Other new equipment on the rig includes a 13 5/8-in., 15,000-psi **Cameron** BOP stack, 15,000-psi choke manifold, **Franks** Hawkjaw power tongs, a rotating mouse hole and **Canrig** 750-ton AC top drive. The rig

also has a complete new winterization system.

GLOBAL UPGRADES JACKUPS

With its deepwater rig fleet "in pretty good shape," **Global Marine Drilling Co** is now concentrating on upgrading several of its jackup units. Global Marine's Glomar Baltic headed for Trinidad in early September after upgrading. And in mid August, work began in Trinidad to upgrade the Glomar Labrador.

Work being done on the jackups primarily involves rig mud pumps, other components of the mud handling system and the power plant. In revamping mud pumping capacity, Global Marine is either adding a third pump or upgrading existing 3-pump packages from **National** 12P units to National 14P pumps. The 2,200-hp 14P pumps are rated at 7,500

psi. The two 12P units on the Glomar Baltic have been replaced with three 14P units, for example.

"When you upgrade the pumps, then you need more power," said **Charles P Keaton**, Global Marine's Vice President Engineering. "Then it is necessary to determine if the shaker house is capable of handling the new flow capacity."

To meet higher power demand, the three **EMD** engines were replaced with five **Caterpillar** 3516 units. A shale shaker was also added and the shaker house enlarged. The Labrador, will get a third National 12P pump and its five 399 **Caterpillar** engines will be replaced with five 3516 **Caterpillar** units.

"Variations of these two upgrades will be performed on at least 3 jackups in the Gulf of Mexico and maybe one in West Africa," said Mr Keaton.

With strong rig building and upgrade activity, equipment for an upgrade can have long lead times, said Mr Keaton. Electrical equipment and high pressure valves were recently among the items with the longest lead times.

The cost to add a third National 12P pump, change 5 engines, and upgrade the electrical system to handle the 3-pump configuration is estimated at over \$8 million, not including any lost revenue or downtime. To change to three National 14P pumps requires that piping also be upgraded to handle the higher pressures; that approach can cost up to \$14 million, said Mr Keaton.

That estimate does not include the cost of replacing the drill string with a larger size, a change that may be desirable due to the higher capacity of the larger pumps. A 5-in. drill string might be replaced with a 5 1/2-in. or 6 3/8-in. string. A 5 7/8-in. string is also a popular choice.

"We wouldn't do these upgrades on all our jackups," said Mr Keaton. "But it makes sense for those that operate in certain markets."

Though some fear the recent drop in natural gas prices will have a negative impact on drilling in the Gulf of Mexico, international markets are strong.

Overall, "we are relatively optimistic," said Mr Keaton. ■