Ultra-premium jackups are fit for deep shelf drilling

A NEW CLASS of jackup offshore drilling rigs is evolving to meet increasingly demanding drilling conditions on continental shelves around the world.

Though water depths are in a range for which jackups are suitable, trends to deeper wells and extended-reach drilling call for rig equipment with increased capacity.

The "ultra-premium" class jackups are designed to meet these demands.

Only 7 jackups in today's fleet of approximately 392 are classed as ultra-premium. But according to **William E Chiles**, President and CEO, **Chiles Offshore Inc**, "That fleet must grow if contractors are to keep pace with these key trends in shelf drilling."

Chiles Offshore operates 3 ultra-premium class rigs, about 43% of the total available units in the class, and has two more units under construction for delivery in 2002.

Deeper drilling is the primary driver of increased jackup rig capability. Deep high temperature, high pressure (HTHP) gas wells to 30,000 ft require significantly more horsepower, more storage and more deck load capacity than is typically available in much of the jackup fleet.

High-temperature, high pressure wells may require drilling fluid circulation at rates to 1,400 gal/min and circulating pressures of as much as 4,500 psi. Bottomhole temperatures may reach 450 degrees. At these depths, more drilling fluid volume is needed and more drilling fluid types are used, increasing deck area and variable load requirements.

Extended reach drilling operations also put additional demands on drilling equipment.

And higher risk wells put a premium on environmental protection. Zero discharge will be the standard that offshore drillers and operators must meet.

To meet the requirements of deep drilling on the continental shelf, Mr Chiles suggests the following design goals for new ultra-premium jackups:

- Improve safety;
- Broaden capabilities;
- Increase efficiency, depth capability;
- Improve environmental protection;
- Enhance living conditions for crews;
- Keep capital cost within limits.

ULTRA-PREMIUM CLASS

Ultra-premium jackups have a deeper water depth rating than most other jackups. They have more usable load and deck space and typically have an extended cantilever reach.

An ultra-premium jackup has superior hydraulic horsepower and fluid processing capabilities and is usually outfitted with 3 large mud pumps.

Chiles Offshore ultra-premium jackup Coronado is one of 3 in the company's fleet; 2 more are scheduled to be delivered in 2002.

This class is able to handle large diameter pipe required for deep well casing programs. Two new rigs have automated tubular handling.

A strong focus on safety, efficiency, and living conditions is a critical element, and continual onboard training and development is essential.

Chiles Offshore has 5 ultra-premium jackups, 2 of which are newbuilding for delivery in 2002.

Two designs are represented, the **LeTourneau** Class Super 116, an enhanced version of the LeTourneau 116-C; and the **Keppel FELS** Mod V "B" Class. These units have increased hull and spud-can strength to carry additional leg and higher loads.

Higher strength material in the legs (100 ksi instead of 70 ksi) makes possible a design that reduces leg drag.

The rigs also have a larger water plane area to improve characteristics while afloat and increase the preload capacity.

They are preloaded to 15,400 kips per leg vs 12,200 kips for other units, making it possible to simulate a 25-year storm load in the deeper jackup water depths of 350 to 400 feet.

Leg length of the units ranges from 477 ft to 544 ft; cantilever reach for all is 70 ft. The units' total engine capacity ranges from 9,275 hp to 11,130 hp.

The Chiles Offshore ultra-premium rigs have a full 3,000-hp drawworks compared with a 2,000 hp for a typical jackup. Mud pump horsepower is 6,600 compared with the 3,200 typical of other rig classes.

Mud pump discharge piping is rated for 7,500 psi working pressure and designed for flow rates to 2,500 gal/min. Typical rig flow rates are 1,200 gal/min.

The Chiles Offshore ultra-premium rigs have 1,500 bbl of brine storage and 1,200 bbl of base oil storage. Total mud capacity is 4,200 bbl and up to 7,000 bbl on several of the rigs, not including solids control pits, and the system can handle 3 to 4 fluids simultaneously. The system includes a shear pump and 2 shear pits.

The solids control system is built around 5 **Brandt** cascading shakers with distribution control able to handle 2,500 gal/min. One Brandt 32-cone mud cleaner/desilter over the linear motion screens is rated at 1,920 gal/min.

Other elements of the solids control system are a Brandt 4-cone desander over the linear motion screens rated at 2,000 gal/min and 2 Brandt degassers rated at 1,000 gal/min each.

A Brandt/**Nutec** gumbo chain is mounted under the drill floor.

AUTOMATED DRILLING SYSTEM

The Chiles Offshore ultra-premium rigs are outfitted with a **Hitec** Cyberbase driller's system that permits automated control of mud pumps, drawworks, power swivel, rotary and slips. Triple redundancy is provided by 2 driller's chairs with independent servers plus manual controls.

"The automated drilling system enhances safety, efficiency and performance by improving the work environment and minimizing the presence of crew in high-risk areas," said Mr Chiles. "Precise control of drilling functions allows more efficient operation of equipment and better communication between operating personnel, increasing safety."

State of the art communications is becoming an important element in boosting drilling productivity and in delivering a well that meets all the operator's objectives.

On the ultra-premium rigs, a rig LAN (local area network) connects various areas and functions of the rig using fiber optics where necessary. Periodic and real time transmission of operational and performance data directly to the operator is possible via microwave or satellite link. That link provides continuous voice and real time data to operator and owner offices and direct access to the rig from any telephone line.

PIPE HANDLING, BOP

The Chiles Offshore ultra-premium rigs feature dual pipe handling capability. Drill pipe and bottomhole assemblies can be made up or broken down with full torque while drilling proceeds. The newest rigs will have an automated racking system and the existing rigs are designed for easy retrofit.

The rotating mouse hole on the units has a separate torque tool.

The advanced BOP system on the ultra-premium class rigs features **Cameron** "TL" 13⅝-in. ram preventers that are more compact and lighter than previous designs. Fast lock connectors speed the stack-to-wellhead connection. The two newest rigs employ an 18¾-in., 10,000 psi BOP due to the demands of the deeper wells with larger casing diameters. The BOP handling system can handle an 18¾-in. stack and store a fully assembled BOP and diverter. A test stump at the BOP and diverter setback area is used for testing prior to nipple up.

THE FUTURE

Mr Chiles looks for further evolution of the ultra-premium jackup to provide greater efficiency and safety, featuring these enhancements, among others:

- Casing racking in the derrick;
- Horizontal casing and tool makeup on pipe rack;
- Integrated cuttings processing and handling;
- More deck area;
- Higher variable loads;
- More mud capacity. ■