

# GSF semis are high performance, efficient drillers

**E&P COMPANIES HAVE** been demanding better drilling performance and operating efficiency for several years, well before commodity pricing reached historical highs. With high oil and natural gas prices, operators are still demanding the highest performance available when it comes to exploring for and developing discoveries anywhere in the world. In the Gulf of Mexico, particularly in the deep and ultra-deepwater areas, high performance and efficient drilling operations can save tens of millions of dollars.

**GlobalSantaFe's** two newbuild semisubmersibles represent the state-of-the-art in drilling efficiency and performance. They were designed that way from the ground up, not only with regards to drilling performance but with environmental awareness as well. The two rigs were delivered to the contractor earlier this year from a shipyard in Singapore and steamed under their own power to the US Gulf to begin long-term contracts drilling exploration and development wells for two high profile projects.

The Development Driller I is contracted for two years by **BHP Billiton** for exploration and development work following final sea trials. The contract was set to begin in April. Total contract value is approximately \$157 million, with a dayrate for this unit of about \$185,000.

The Development Driller II, which actually was the first unit to be delivered, also has a contract in the US Gulf. **BP** signed a three-year charter for the rigs to work on its Atlantis project. The estimated 20-well program has a total contract value of approximately \$200 million. Dayrate is around \$210,000. This contract is scheduled to commence in July.

## INCREASING EFFICIENCY

GlobalSantaFe designed increased operating efficiency into virtually every component of the rig. Safety is also a prime factor in the rig's design as is minimizing the environmental impact of drilling operations. The rigs have 18,000 sq ft of usable deck space with more than 46,000 tons of operating displacement and more than 7,000 tons of variable deckload.

GlobalSantaFe estimates that the Development Driller can save approximately 20% in overall time on a typical West Africa well in 1,500 m of water.

To begin, the rigs can arrive on location with all necessary equipment and supplies on board and begin operations immediately in a dynamically positioned mode while the mooring spread is being laid. The rigs are designed to be conventionally moored in up to 5,000 ft of water. With pre-set moorings the rigs can work in water depths beyond 7,500 ft.

The rigs can be connected to a pre-set system without disconnecting their own anchors from the chain or removing them from the bolsters, eliminating an operation that is potentially hazardous to crew. This also substantially reduces the time required to connect a pre-set system. Additionally, the rig's eight-point mooring system can be supplemented by either an additional four or eight lines, meaning the rig can be safely secured on location to withstand a hundred-year Gulf of Mexico hurricane.

When drilling, two independent load paths, each with heave compensation and rotational capability, allow for concurrent drilling and casing activity in the top hole section. The two load paths also enable the BOP and riser to be run while the top hole section is being completed.

Rig equipment includes two top drives, two active heave drawworks and two iron roughnecks and pipehandlers. Offline tubular stand building and racking is assured with each load path equipped with its own handling system with the capability to transfer tubulars to the other load path.

The 200 ft derrick height provides for quad stands of pipe and casing triples, reducing trip time, casing running time and drilling time. The setback has the capacity to rack a full string of casing, further reducing time since the casing can be racked back in triples while the hole is being drilled.

High capacity drilling equipment includes top drive drilling systems, three 2,200 hp mud pumps plus a 2,000 hp auxiliary pump, and large bore high pressure mud piping. Optimized solids control equipment includes two gumbo conveyers followed by seven high speed elliptical motion shale shakers.

The rigs also feature dual mud systems with a manifold system that completely separates the downtime associated with changing between oil-base and water-base muds during drilling.

## BOP, RISER AND TREES

A separate BOP/riser hang-off cart with the capacity to fully support deployed BOP and riser at the end of the moonpool provides maximum separation between the riser and tree running string. This reduces the risk of interference and allows subsea trees to be run with the auxiliary hoist without recovering the



GlobalSantaFe's Development Driller II, foreground, and Development Driller I nearing completion at the PPL Shipyard in Singapore. Both rigs made the voyage to the US Gulf of Mexico under their own power to fulfill long-term exploration and development drilling contracts.

BOP and riser. Dedicated deck space and a 200 ton gantry crane plus rig cranes sized to handle four of the largest subsea trees further help to reduce non-productive time.

The 18 3/4-in. 15,000-psi BOP is transported in a secure handling system that prevents uncontrolled movement of the BOP. BOP maintenance is improved via a dedicated clean room for working on control pods. The 200 ton gantry crane provides safe handling of the BOP components when it is on the main deck away from the open moonpool.

Additionally, the BOP guide funnel can be released subsea, eliminating the need to bring the BOP to surface for removal.

The BOP is also designed to be ROV friendly, incorporating features such as hydrate inhibitor flushing ports around the connector interface. Fluid injection can also be activated via BOP control fluid from the accumulator system at the surface.

The BOP is stored and maintained on the main deck and placed under the drill floor using an elevator system with a number of features including secure hydraulic cylinders. A guided system

with key fail-safe features runs the BOP through the splash zone.

The rigs feature a vertically stored riser that is transferred between the drill floor and storage racks by a secure two-point gantry crane system in order to minimize damage while improving riser running times. Breechlock riser connections also help speed riser makeup and minimize human contact, resulting in quicker and safer operations.

## ENVIRONMENTAL IMPACT

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The rigs feature full containment systems that process everything including deck drainage to mooring system options that allow the operator to minimize fuel consumption and emissions.

The systems on each rig are powered by eight Caterpillar 3612 engines with emission control equipment that reduces air pollutants to a level compliant with 2007 US Environmental Protection Agency (EPA) regulations. The engines provide more than 40,000 hp.

In other features, the mud process area is laid out with the space to accommodate cuttings cleaning and disposal systems. The mud mixing process has been

automated to minimize personnel contact with mud chemicals and fumes.

The latest water mist fire suppression systems are installed throughout the rig to provide for effective and environmentally benign operations. CO2 and Halon systems have been eliminated.

GlobalSantaFe also has installed Simrad Green SDP 32 dynamic positioning systems to reduce fuel consumption and engine emissions by 20% when in the dynamically positioned mode through the use of computer modeling of predicted vessel motions.

The drain systems on the rig provide a controlled contaminated water collection and treatment system with dedicated discharge points as a means of reducing the likelihood of uncontrolled discharge of contaminants into the environment to a level that is as low as reasonably practicable.

Also, dry bulk product lines are fitted with dust collectors, minimizing waste and reducing dust discharges into the atmosphere during bulk transfer operations. ■