Looking into the future with

Steve Newman, Transocean

By Linda Hsieh, associate editor

STEVE NEWMAN IS executive vice president and chief operating officer of **Transocean Inc**.

DC: In 5-10 years when we're designing and building new rigs, what capabilities will they need in order to develop hydrocarbons in the deepwaters and ultra-deepwaters that operators are targeting?

Steve Newman

Newman: There are a few key issues. One, load path will become increasingly important. Because of the deeper waters, more complex well trajectories and casing strings will be needed to complete those wells. Two, the industry needs more efficient fluid handling for the complex mud systems and completion fluids systems we're using to drill wells. The ability to efficiently handle 2 and maybe 3 fluid systems will become important.

A third issue that's been on the backburner but is becoming increasingly important is well control. We're quite capable of handling 15k psi, but operators have expressed interest in drilling 20k psi wells, and the industry's not ready for that yet.

DC: How soon will we need the well control equipment to handle the 20k-30k?

Newman: I believe those wells would be drilled now if the pressure control equipment was there. I see it happening in a 3-year time frame.

DC: Do you think the lack of that equipment is holding the industry back?

Newman: I wouldn't say it's holding us back because all capable rigs are fully deployed. We don't have drilling rigs sitting idle because there is no 20k psi equipment available. However, when that equipment does become available, rigs will be re-allocated from existing 15k-psi operations to frontier 20k-psi operations.

Transocean is working on key issues such as load path and mud systems to make sure its rigs, such as the Deepwater Millennium, meet operators' needs in the future.

DC: What areas of innovation do drilling contractors need to focus on to reduce costs and increase efficiency for operators?

Newman: There are always ongoing efforts to reduce costs, particularly on the critical path of drilling operations. A prime example is Transocean's joint effort with **Aker Kvaerner Maritime Hydraulics** to develop the modular derrick drilling machine. Top drive component failure has been a significant part of our downtime experience, so we're trying to make the new unit not only more robust to prevent failure but also to make it modular so that when a failure does occur, its impact on the critical path of the operation is reduced.

Dual activity brought critical path improvements to the overall process. Now we're applying the lessons of dual activity on non-dual activity rigs. For example, we've installed auxiliary stations on the Express-class rigs to replicate the efficiencies of dual activity. With rigs like the Transocean Rather and Transocean Richardson, we're capable of outfitting them with the ability to run subsea trees over the side rather than through the moon pool, freeing the well-center up for critical path activities. There are many such examples where our employees worldwide look at everyday operations to figure out how to take simple routine activities off of the critical path.

DC: How long has Transocean been working on the modular derrick drilling machine?

Newman: Since 2004, and we expect to have a prototype by the first quarter of 2007 that we can subject to rigorous factory tests. We're also considering putting it in service on one of our existing rigs in late 2007 to test it under true operating conditions.

DC: Do you think that modular concept will become more widespread in our equipment in the future?

Newman: I believe so. Right now, a failure in the main shaft or main bearing on a top drive means there's no alternative other than laying down the top drive, sending it out for repair and sending it back out to the rig. This translates into

about a week of downtime, as a minimum. With our modular approach, even a critical component like a main shaft or a main bearing can be replaced on the rig with the unit in the derrick, which takes something that costs the well construction process a week down to about 12 hours. It's a dramatic improvement in mitigating the impact of a failure.

Q: How soon will we need the 20,000 psi well control equipment?

A: Those wells would be drilled now if the equipment was there.

I think we will continue to look at different equipment with that modular concept to facilitate rapid change-out. The BOP control system is a system we'd like to do that with, and maybe that's part of the next wave of rig equipment we will look at.

DC: How do you think dynamic positioning capabilities will factor into future rigs?

Newman: I think it's less about DP capabilities and more about power management. None of the incidents in the past 3 years when a rig lost position has been related to the DP system. Half of them are failures in power generation or power management. Transocean is working closely with **Siemens** to incorporate into our rigs the technology that utility power distribution companies use to manage their grids, which makes their grids more flexible, more robust and less prone to outages.

For our existing DP installations, Transocean has developed an advanced generator protection system, which has several key objectives. One is to prevent component failure in any aspect of the power-generating or power distribution system. The second is to detect failures when they do occur, and the third is to mitigate the consequences of those failures. We plan to put the system on our existing DP installations, as opportunities present themselves over the next few years.

DC: Do you think the increase of automation technologies will lead to a clear trend in smaller rigs that don't have to accommodate as many crew members?

Newman: No, because the size of the rig is not about the accommodations block. The size of the rig is dependent on the load path and the deck load capability of the rig. As long as operators are drilling wells in 10,000 ft of water and 20,000 to 30,000 ft below the mudline with 8 or 12 casing strings, the industry will need big rigs capable of supporting the magnitude of the logistics involved.

DC: Then how do you think automation will affect rigs of the future?

Newman: Automation will have a bigger impact on the skill set of the people we need. In the early days when we had mechanical relays in the electrical systems, we needed workers who could trace out wiring diagrams. We don't have mechanical relays anymore. We have PLCs, programmable logical controllers, so we need workers who can manipulate the programs to operate that equipment. On the drilling side, roughnecks used to wield 20-lb sledge hammers. Today, we need roughnecks who can operate highly automated drillfloor equipment. It's a different skill set.

DC: Transocean has been setting deepwater drilling records from 1,969 ft in 1974 to 10,011 ft in 2003. What kind of depth record do you imagine Transocean might be setting 10 years from now, in 2016?

Newman: That's an interesting question. When we were building rigs in the mid-'70s, such as the Discoverer Seven Seas, people thought we were crazy for building a rig that drills in anything deeper than 500 ft or 800 ft of water. The attitude was: We don't even know if oil is out there, and even if it is, we don't think anybody will ever want to go out there and get it.

Flash forward to late 2003 and we've drilled in over 10,000 ft of water. Now we're building rigs capable of drilling in 12,000 ft water depths, and we will continue to push those boundaries. What will the boundary look like in 2016? I can't say for sure. In 2016, we may be using rigs for purposes other than oil and gas exploration. We may be looking at manganese nodules, hydrates, or other seafloor mineral excavation.

DC: What will be the biggest limiting factors keeping us from going deeper?

Newman: Equipment will play a significant role. To enable a more efficient transition into deeper waters, we're looking at the riser string. In 10,000 ft of water, the demands on the riser string are enormous. Even though riser joints are outfitted with buoyancy to minimize their weight in water, they still have tremendous mass. On some rigs, 15k-psi choke and kill lines contribute an immense amount of weight and mass to the riser joints. We're looking at composite auxiliary lines to reduce the mass of the riser in water and to reduce the weight of the riser while it's sitting on the deck in-between wells.

Q: What are the key issues in future rig designs?

A: Load path, mud systems, well control equipment.

Additionally, the reliability of BOP control systems must improve. Pulling a BOP in 7,000 ft of water to repair a component failure can cost 7 or 10 days. Obviously, the costs increase even more when you're operating in 15,000 ft of water.

DC: Will there be any differences in the way rigs are maintained a decade from now?

Newman: I don't foresee significant changes. Transocean's approach has always been to maintain our equipment in service, and I think that will continue to be our main premise.

DC: Looking over the past decade, what are 1 or 2 milestones the industry has set in terms of rig design?

Newman: Dual activity was clearly a major milestone. Everything else is evolutionary. For example, there's a greater predominance of top drive drilling, there are higher-pressure mud systems to improve bottomhole hydraulics, and there's bigger solids control equipment — but I would characterize all of those as evolutionary.

DC: What do you think of coiled tubing and how will it factor into the industry's future?

Newman: The real near-term application for coiled tubing is a concept of through-tubing rotary drilling where we go back to clients' existing reservoirs with existing completions. To re-complete the well, historically the existing completion had to be pulled. Through-tubing rotary drilling would allow the existing completion to be left in the ground, a window to be cut in the existing tubing and casing, then sidetrack the well to another part of the reservoir. That's the approach I see.

DC: What are some interesting rig technologies coming out and how do you think they will benefit the development of hydrocarbons in the future?

Newman: I'm not sure I would characterize it as new rig technology, but I would look at the overall process. Considering intelligent downhole tools and the sophisticated control systems on the rig, currently there isn't a great means for connecting everything together. Rotary steerables offer the ability to accurately pinpoint the bottomhole location, and in many instances, we still rely on mud-pulse telemetry to get the downhole information to the driller who's operating the blocks and the top drive and to the directional driller handling the downhole tools.

If the industry could figure out how to increase the data transmission rate and improve the reliability and application of that equipment offshore to provide the geoscientist with a full suite of real-time information about downhole conditions, that will significantly improve the overall outcome.

Another aspect of improved process is better pressure control. In deepwater, the pore pressure gradient and the frac pressure gradient are so close together, there's very little margin for error. Oftentimes you find yourself either solving lost circulation problems because you've exceeded the frac pressure gradient, or solving well control problems because you've gone below the pore pressure gradient. That results in a tremendous amount of nonproductive time for the client.

The industry has spent a lot of time looking at managed pressure drilling; our own version of that is continuous annular pressure management, or CAPM, where we create the ability to far more accurately control the downhole pressure environment so you're able to walk that narrow line between the 2 gradients. You eliminate casing strings, nonproductive time and reservoir damage and get better wells and productivity and access to reservoirs that are currently not drillable.

Steve Newman is executive vice president and chief operating officer of Transocean Inc. His duties include leading Transocean's operations, engineering and supply chain management functions.