Looking into the future with

Jon Cole, Scorpion Offshore

By Jerry Greenberg, contributing editor

JON COLE IS president and CEO of **Scorpion Offshore**.

DC: Given where oil prices are today and expectations are that they won't soften much more, operators seem to be increasing the base economic estimates to as high as $30 per barrel, and the margin is certainly higher than that. Given that criteria, what technology advances do you expect in drilling 5-10 years from now?

Jon Cole

COLE: There are a whole host of technologies that would benefit the industry. To list some of the areas where I would expect to see significant advances: "riserless" deepwater well intervention, free-standing deepwater drilling risers, dual gradient drilling, increased use of casing drilling and underbalanced drilling offshore, better data communication between downhole and the surface, improved recovery through fracturing and stimulation of existing reservoirs, more advanced coiled tubing drilling, and larger, more powerful drilling equipment.

Although this doesn't exactly pertain directly to technology, the rig of the future is going to depend on the employee of the future. We need to begin recruiting and developing the people who are going to be the future of this industry. These will be forward-thinking individuals who are able to deal with today's technology and are comfortable with it. It may prove easier to train a 20-year-old newcomer than an industry "veteran" to drill on a high-tech rig. Ultimately the highest tech piece of equipment that we all have is somebody with a good head on their shoulders.

DC: What has Scorpion Offshore done with its newbuild rigs to prepare for operators' requests in the future?

COLE: Our rigs were developed with drilling efficiency and safety in mind. In other words, we attempted to spend money in areas that result in improved efficiency, such as the mud system, and to minimize spending in areas that do not add value to the customer. Therefore, we focused on providing a lot of hydraulic horsepower, high-volume cuttings cleaning capabilities, large-capacity mud pits capable of handling two separate mud systems, adequate free deck space for managing variable load, off-line stand building capability, as well as a heavy-duty cantilever, derrick and hoisting system. We envisioned working in deeper water, in remote locations and drilling deeper and in more difficult reservoirs.

Jon Cole, president and CEO of Scorpion Offshore, said his company has "decided to do less of the computerized, hands-off rig management systems," relying more on human beings, proper training and a more traditional approach to drilling. Show above is Scorpion's Offshore Courageous, a deepwater, extended-reach cantilever drilling unit.

In our effort to enhance drilling efficiency and safety, we are installing **Varco** casing running tools (CRT) and **MD Totco** data recording packages on all of our rigs. The CRT eliminates the need for a stabbing platform and rigging up casing tongs. That is a safety and efficiency enhancement. The data recording package will allow us to capture relevant drilling data that will allow us to benchmark our performance. In all cases, we are applying technology that someone else developed. That is really the drilling contractors' story — applying technology as opposed to developing it.

One area we have approached differently than some of our competitors is the use of computerized, hands-off rig management systems. Scorpion's rigs do not have driller's chairs with touch-screen controls, and we do not have automated pipe-handling equipment in our derrick. Our management looked at their experience and saw that a lot of automated equipment improved neither safety nor efficiency. Yet it increased capital cost and downtime as it was less reliable than a manual system. We have tried to focus on providing drilling efficiency by using automation and mechanization where it is appropriate and by relying on human beings, proper training and a more traditional approach to drilling to eliminate potential areas of downtime and loss of productivity to the customer.

DC: You mentioned computers and making use of joystick type computerized drilling and pipe handling less reliable?

COLE: Our experience leads us to believe that automated pipe-handling is less efficient. During start-up of a new rig, there are two issues that frequently

cause problems. The first is standardizing the location of the proximity sensors so the software knows where everything is. The second is the PLC boards and software that recognize the location of the proximity sensors and tell the various pieces of moving equipment how to interact with each other. There is a lack of standardization of the PLC boards and software that control the operation. Therefore, troubleshooting that equipment upon delivery is a unique problem for each rig.

Once the pipe-handling system is operating efficiently, experience shows that the automated system will handle pipe about 60% as fast as a manual system. We are almost twice as fast by handling pipe with people. That is the state-of-the-art in pipe-handling automation right now — people are still a more efficient tool. Of course, I am talking from a jackup perspective, where we are handling conventional drill pipe and bottomhole assemblies. In this case, humans with proper assistance from Iron Roughnecks and top drives are simply faster.

Deepwater drilling introduces riser handling, as well as larger drill strings and possibly making up and racking back stands of casing. In this instance, the automated equipment is mandatory.

Additionally, our experience does not show that automated equipment improved safety. Once again we are drawing on the experience that management had with prior companies. There wasn't a significant difference in safety records between manual and automated systems. It was always anticipated that automated systems would be significantly safer, but that hasn't proven to be the case yet.

DC: Do you think drilling contractors are installing that equipment more because it is available rather than necessary?

COLE: From a deepwater floater point of view, automated pipe-handling equipment is necessary. For a jackup drilling 25,000 ft wells, it is not required. There are customers who like automation for their own reasons, and there are customers who will focus on being able to drill faster with a more conventional system. In general, we think we can do a more efficient job without automation.

DC: As far as Scorpion is concerned, your rig of the future is a fairly standard jackup except for the mud system?

COLE: No, our jackups are fairly "standard" only when compared with the new generation of jackups that are being built. However, almost all of the jackups to be delivered in the 2005-2010 period offer significant advantages over those built in the 1980s and earlier. Compared with the last generation of jackups, the new rigs have longer leg lengths, greater cantilever reach, more deck space, greater variable deck loads, larger mud pit capacity, greater mud processing capabilities, stronger derricks, significantly more hydraulic horsepower from the mud pumps, better top drives, more installed engine horsepower to run the additional equipment, and larger quarters.

The majority of the new rigs have 1.5-million-lbs derrick capacity; although, there are a few 2-million-lbs capacity jackups being built. The latter units are addressing a narrow market for drilling 30,000-ft-plus wells that require running larger, heavier casing strings. Other than a handful of heavy-duty and harsh-environment rigs, jackups built before 2004 generally have a 1- or 1 ¼-million-lbs hookload capacity. Those units won't be capable of handling the deeper, tougher wells that operators are starting to drill.

Also, we have tried to learn from the recent expansion of the deepwater market. New-generation deepwater rigs are significantly more efficient than earlier floaters. We are trying to capture similar ideas in our jackups. Dual- and high-capacity mud systems and mud-cleaning equipment, as well as offline pipe-handling, are all lessons learned from recent deepwater advances. By incorporating these features, we expect Scorpion jackups to substantially improve drilling efficiency compared with conventional jackups built years ago.

DC: What new technology is under development now that would enhance the efficiency and performance of future rigs as operators face new exploration challenges?

COLE: Anything that reduces nonproductive time and increases penetration rates will be welcomed by the industry. This could entail technology in the form of new and/or improved equipment, or better management of the drilling process on the part of both contractor and operator. Enhanced Internet communication between the rig and both the operator's and contractor's shore base is an example of a technology that should enable capturing of best practices and optimizing the learning curve in drilling a well.

From a Scorpion perspective, we will look at a slightly larger class of jackup that would give us access to harsh-environment markets while balancing the trade-off between additional capital cost and profitability. As long as we are considering a larger rig, we would probably look at going for a higher-capacity derrick and drawworks with even more offline capabilities.

Q: How does automation fit in on future Scorpion rigs?

A: We think we can do a more efficient job without automation.

DC: When you say new class of rig, you are talking new series of rigs?

COLE: We are looking at several jackup designs, and some are larger than the rigs that we are currently building. We are trying to identify the proper trade-off between rig capabilities and capital cost in order to optimize marketability and efficiency for our customers.

DC: You are looking more at mainstream drilling in the future, not at deep wells and or high pressure/high temperature wells?

COLE: No, we see the "typical" jackup well becoming more challenging. It could be deeper, more remote, have a longer horizontal section, involve a complex completion, or be high-pressure and high-temperature. We are targeting demanding customers with more difficult wells.

Our rigs are fully fitted for HPHT wells, and we have high-pressure blowout preventers on order for the first two rigs. I think we will see increases in HPHT drilling in the Mediterranean, Arabian

Gulf, the central sector of the North Sea and India.

Hopefully the industry will develop better seismic and processing in order to see below the salt and develop more 20,000-ft-plus prospects in the US Gulf of Mexico as well. These are all target markets for the company.

DC: What are some of the things that operators are inquiring about today that may be something to look forward to in the future?

Q: What are operators inquiring after and concerned about?

A: We can drill to 32,000 ft, but can operators afford to take a year to drill to that depth? I don't think so.

As far as "mainstream" wells, I think that oil companies are recognizing that larger, more powerful units can provide increased efficiency, which justifies their extra cost. For example, in Qatar, operators have historically chosen the 250-ft class of rig, as they felt that the additional expense for a larger rig was unwarranted. They have recently hired some 300-ft class jackups, and they have noticed that by virtue of their larger size, more deck space is available for staging their equipment; they have more mud pump and pit capacity; and they are drilling holes more efficiently.

COLE: Operators are concerned about their ability to economically drill to deeper horizons. Can the industry currently drill to 32,000 ft? Yes. Can the customer afford to take more than a year to drill a well this deep? I don't think so. We are seeing the same thing in deepwater. Some of the new floaters have 40,000-ft drilling capability. It is great if you can reach that depth; however, ultimately you have to be able to deliver a hole that makes the customer money. Our customers can't drill too many $200 million wells and profitably develop an oilfield. In my mind, the challenge to our industry is not simply developing and applying technology to do something that we have never done before but being able to economically accomplish the customer's objectives.

Good seismic interpretation below salt would be huge for the US Gulf of Mexico. It has nothing to do with a drilling rig, but it would define more prospects, particularly in the US. Eventually, North Sea and US Gulf of Mexico operators will need 20,000 psi drilling and producing equipment in order to develop HPHT reservoirs that are needed to meet the shortage of natural gas in those major markets.

To see a video of the Offshore Courageous rig being launched in November 2006, go online to www.drillingcontractor.org.

Jon Cole has spent his entire career in the contract drilling industry. Before leaving Transocean, he served as executive vice president of marketing and executive vice president of inland and shallow water (US Gulf of Mexico). Mr Cole also served as a senior vice president at ENSCO before joining Scorpion.