

DEA Workshop presents deepwater solutions

THE DRILLING ENGINEERING Association's (DEA) 2003 DEA Workshop, *Deepwater Drilling: Where are we Headed?* is scheduled for 17-18 June at the Moody Gardens Hotel in Galveston, Texas.

Technical papers, panel sessions and breakout sessions will explore two major issues. First, what work remains in deepwater? What technical gaps remain to move from ultra-deepwater (depths of 7,500 ft plus) to routine development drilling in those water depths? What direction should the industry take to achieve solutions in the areas?

The second issue is technology transfer. What technologies already developed for deepwater can be applied onshore?

Registration and exhibit viewing will begin at 7:00 a.m. with papers in the first technical session to be presented beginning at 8:00 a.m.

DEEPWATER TUBULARS

The first technical session will examine deepwater tubulars. There will be a coffee break and time to view exhibits following these presentations.

Presentations include *Advanced Qualification Topics for Deepwater Drilling and Landing Strings* by **M L Payne**, Upstream Technology Group, BP; **R B Livesay**, Hecate Software; and **U B Sathuvalli**, Blade Energy Partners. The paper addresses aspects of drilling and landing string design with special attention to issues that typically manifest in deepwater drilling. The performance of a landing string is controlled by the pipe body yield strength (PBYS), the tool joint weld integrity and the pipe-body slip crushing resistance. The PBYS determines allowable margin of overpull while the slip crushing load determines the maximum hanging weight of the string. The tool joint weld is a critical but sometimes overlooked factor that controls overall structural integrity. Using case studies, the presentation will illustrate how each of these

performance criteria is maximized by careful analysis of inspection data on new and used strings.

Tom Williams with **Maurer Technology** will update **Noble Corporation's**

New Aluminum Riser Initiatives. Mr Williams will discuss the initiative from manufacturing the riser in Russia to rig and economic impacts to application and use. The riser is being tested offshore Brazil and additional risers will be installed on several of Noble's rigs in the Gulf of Mexico.

Optimizing a Drilling Riser for Deepwater Operations authored by **David P Huey**, **Kenneth K Bhalla** and **Matthew J Stahl** with **Stress Engineering Services** will examine riser design and configuration for water depths greater than 5,000 ft to achieve the best and safest operations conforming to API RP16Q. Performing the necessary riser analyses to determine behavior before finalizing its configuration, or even before final selection of the drilling rig, will result in improved chances of trouble-free deepwater riser operations. Following the selection of an optimized riser, two additional analyses are commonly performed: a connected operations analysis to determine optimal offsets and riser top tension for various mud weights, sea states and current conditions; and a drive off/drift off analysis to establish green, yellow and red zones for emergency disconnect procedures.

DEEPWATER RIGS AND VESSELS

A Stand Alone FPSO with Drilling Facilities and Surface Completed Trees will be presented by **L Poldervaart**, **Single Buoy Moorings**; **J Cerez**,

Pride International; and **H Tiebout**, **GUSTO Engineering**.

The authors will describe a new concept of a floating production, drilling storage and offloading (FPDSO) vessel. By including the drilling function within an FPSO an economically effective field development using simultaneous drilling, production and well maintenance is created. The FPSO has a unique feature from which rigid production risers are suspended and tensioned by a tension leg deck (TLD) located above the water level in the middle of the FPDSO moon pool. The BOP stack and the

surface completed production trees are located on the TLD, making them easily accessible. The tension or uplift force of the deck is provided at the deck corners by ballast weights inside a rocker arm system (AS) located on the FPSO deck. This concept has been developed for a typical West African field in water depths ranging from 400 to 3,000 m. The FPDSO-TLD facility has been modeled and has the flexibility to support all required drilling and production equipment for a wide range of field development scenarios.

As rigs move into deeper waters and the costs of operations increases, the need to provide more complete, complex and reliable support to the underwater components becomes increasingly important. **Richard Frisbie** and **Charles Royce**, **Oceaneering International**, will present *Ultra-Deepwater Drilling Support Capabilities*. They will discuss present capabilities and then future capabilities and potential opportunities for supporting ultra-deepwater operations.

Today's generation of ROV is not being used as effectively as possible to provide optimum support of ultra-deepwater drilling operations, the authors contend. Emerging capabilities further separate what can be done from what is being done. A state-of-the-art capability integrated with the subsea components can reduce the annual costs of drilling oper-



ations by several million dollars per year. Significant savings and improved risk management is possible with a better understanding and application of emerging ROV technologies.

Chip Keener with **Transocean** discusses *Performance Gains with 5th Generation Rigs* as the company's fleet of newbuild deepwater units have accumulated an aggregate of 35 rig years of work experience, including deepest water depth, deepest subsea completion and deepest moored operation. The rigs are experiencing significant performance gains, some of which are attributable to dual or off-line activity, and some in benefit of higher specification equipment such as pump pressures, and flow rates.

Luncheon and time to view the exhibits follows until a panel session begins at 1:00 p.m. The panel is entitled *Closing the Gaps on Vessels and Tubulars* and includes operators, drilling contractors and service firms discussing the technical gaps the industry must overcome in vessel and tubular technology to advance drilling in ultra-deepwater from exploration to routine development operations. This session will open areas for subsequent discussion by the breakout sessions.

Three breakout sessions begin at 2:00 p.m. and will separately discuss existing gaps in annular flow, wellbore stability and well control. Each group will develop a brief report to be shared with all workshop attendees during the afternoon wrap up.

Additional time for exhibits viewing and a welcoming reception begin at 6:00 p.m.

Registration on Wednesday, 18 June begins at 7:00 a.m. followed by the first technical session of the day.

WELLBORE STABILITY

James W Bridges and **Ken Williams**, **Knowledge Systems Inc.**, will present the *Summary of Results from a Joint Industry Study to Develop an Improved Methodology for Prediction of Geopressures for Drilling in Deep Water*. Geopressure and wellbore stability problems continue to present challenges for deepwater drilling. This presentation will discuss a summary of findings from the DEA 119 study to mitigate these critical problems and develop

improved methodology for geopressure prediction in deepwater. The authors will also discuss current aspects of the study and how new technology can impact the success of drilling operations both in the challenging deepwater environments and in the deeper sections of basins located onshore and on the shelf.

The two primary objectives of Phase 2 of DEA 119 already underway will also be

discussed. They are to build geopressure models for several deepwater basins, mainly in the Gulf of Mexico; and to develop an improved fracture gradient prediction methodology for deepwater wells.

Setting a New Standard for Solving Deepwater Drilling Problems will be presented by **Gary Faul**, **ConocoPhillips**; and **Mark Holland**, **Larry**

Brooks and Tom Sanders, Enventure Global Technology. Once thought to be a last resort for solving unusual problems, the installation of solid expandable tubulars is proving its validity as the first and foremost solution to common drilling challenges and unforeseen events. Solid expandable tubular technology is quickly shedding its cost-prohibitive reputation by preserving budgets and saving rig time.

An excellent success rate reflects the ability of this technology to address a myriad of common drilling challenges from restoring lost circulation to maintaining sufficient wellbore size at total depth, particularly in deepwater applications. This presentation will describe how the solid expandable tubular solution is economically advantageous as well as a safe alternative when used as a solution for common drilling challenges. It will also discuss how this particular solution set records during installation and how expandable technology continues to evolve and redefine its uses.

Ron Sweatman, Chairman, API Work Group on Annular Flow Prevention, will discuss *Well Design, Drilling & Cementing Practices to Help Prevent Annular Flows*. In June 2000, API and Minerals Management Service (MMS) agreed to work together to prepare new standard practices to help prevent and reduce the occurrence of blowouts and sustained casing head pressure in all wells and shallow water flows in deepwater wells. This presentation will provide an overview of the API Work Group that was formed to prepare relevant documents and summarize the contents of the first document that was published in September 2002 as API RP-65 titled *Cementing Shallow Water Flow Zones in Deep Water Wells*. Included in this presentation will be a brief mention of the next document that will address deep zones in deepwater wells and all zones in other wells.

The final presentation of this technical session will be *Long-Term Integrity of Deep Water Cement Systems Under Stress/Compaction Conditions*, presented by **Fred Sabins with Cementing Solutions Inc.** The presentation will discuss a joint industry project co-funded by industry, the Department of Energy (DOE) and the Minerals Management Service (MMS). The project is focused

on evaluating the ability of cement compositions to provide well integrity and zonal isolation through zones in which subsidence, compaction and excessive stresses can be long-term problems. A significant number of wells drilling in deep water may not have adequate long-term zone isolation. The analysis of a set cement's ability to seal under downhole conditions is a challenge. A significant aspect of this project has been to develop a correlation of the conventional cement tests with rock properties tests in conjunction with realistic annular seal model studies. This correlation will allow the prediction of the ability of various cement systems to seal under downhole stress conditions.

WELL CONTROL

The first presentation under Well Control, *The Effects of Improved Drill Pipe Properties on BOP Shearing Capabilities*, will be made by **Bryce Levett**, with **Varco International**. The majority of drill pipe used for deepwater drilling is API grade S-135. In the past few years drill pipe manufacturers have made improvements to the properties of this grade for increased torsion capacity, fatigue life and collapse strength. Changes in Charpy impact value ranges have not only produced a newer class of S-135 drill pipe but have raised the bar on what is being produced and sold as standard S-135 drill pipe as well. Empirical data will be presented from shearing tests performed on both standard and improved Charpy impact class drill pipe that shows a significant increase in force required to shear improved pipe. Empirical data will be compared to conventional shear calculation methods and improved shear calculation methods. The resulting data and calculations show that some existing BOPs are not capable of cutting the improved drill pipe now in use and therefore may not be able to control the well in an emergency situation.

Ray T Oskarsen and Dr Jerome J Schubert, **Texas A&M University**, will present *Recent Advances in Ultra Deep Water Calls for New Blowout Intervention Methods*. The most recent blowout containment procedures for deepwater blowouts can be found in DEA 63, *Floating Vessel Blowout Control*, which was released in September 1990. A project has begun that will expand on DEA 63. The purpose of the

project is to create procedures and guidelines for blowout containment in ultra-deepwater. Developing and validating the procedures require a dynamic kill simulator. Because no dynamic kill simulator currently available to the industry can perform all the simulations necessary, the project is developing one. Upon completion, it will be capable of simulating conventional and dual density wells; circulation paths through a drillstring located in the blowout well or relief wells; returns to the surface via the drilling riser, choke and kill line, seafloor pumps and return line, or returns to the ocean at the seafloor; underground blowouts; and bridging tendencies.

The second panel session will follow luncheon and time to view exhibits. The panel, beginning at 1:00 p.m., will examine *Closing the Gaps on Annular Flow, Wellbore Stability & Well Control*. The panel will discuss the technical gaps to be overcome in several important areas to advance drilling in ultra-deepwater from exploration to routine development operations. **John McCarroll**, Drilling Engineer, **Minerals Management Service**, will be one of the panelists.

Breakout sessions will follow this panel. Three breakout sessions will separately discuss existing gaps in annular flow, wellbore stability and well control. Each group will develop a brief report to be shared with all workshop attendees during the afternoon wrap up.

Closing remarks and adjournment will be at 5:00 p.m.

The Workshop Planning Committee includes **Mike Utt**, Unocal; **David Dowell**, **ChevronTexaco**; **Dr Michael Payne**, BP; **John Rogers**, US Department of Energy; **Ed Smalley**, Gas Technology Institute; **Glenda Wylie**, **Halliburton Energy Services**; **Morris Keene**, Occidental Oil & Gas Corporation; **Gary Collins**, **ConocoPhillips**; **Roy Long**, US Department of Energy; **William Hauser**, **Minerals Management Service**; **Ron Bland**, **Baker Hughes INTEQ**; and **Don Duttlinger**, **Petroleum Technology Transfer Council (PTTC)**.

Exhibitors to date include **Aberdeen Drilling Schools**, **Halliburton Energy Services**, **Knowledge Systems** and **Maurer Technology**. ■