2nd deepwater session: interventions, 5th gen rigs

11 INTERVENTIONS IN 15 DAYS

Between 27 August and 12 September, 2001, Norsk Hydro performed 11 subsea well interventions in 15 days in the Troll Oil field. The work was done from Smedvig's 5th generation, DP, dual derrick semisubmersible West Venture.

The selection of the strategy of using a high-spec, full blown drilling and completion vessel was initially based on a budget of 19 days for a total of eight interventions. It was later decided to include three more wells in the campaign. Performing 11 interventions in 15 days implied an average of 43% time-saving relative to the budget.

This paper describes the scope that was covered, and the way the overall campaign took maximum advantage of the DP and the dual activity features of the West Venture.

The paper also presents a simplified comparison between the West Venture and the competing concepts: an anchored single rig semisubmersible, a DP single rig semisubmersible and a subsea wireline monohull vessel.

The comparison shows that the West Venture will normally outperform all known existing competing concepts through a very significant reduction of the overall time for the operations. A comparison with an anchored, single derrick rig yields a 70% time saving thanks to DP and dual activities.

Performing Eleven Subsea Interventions in Fifteen Days (SPE/IADC 79832) by **H Gai, T L Malcolm**, **BP**.

PERFORMANCE GAINS

Transocean's fleet of newbuild, deepwater, 5th generation rigs, have accumulated an aggregate 35 rig years work experience. Among the accrued world records are the deepest water depth, the deepest subsea completion and the deepest moored operation.

In confirming and assessing the gains, Transocean has collaborated with select clients in a modeling exercise, comparing the performance of 5th generation rigs with earlier builds. Representative performance has been distilled from the IADC Reports, such that well curves can be predicted and compared for each of the rig classes, in relation to 'standard' geologic profiles in the Gulf of Mexico, Brazil, Nigeria and Angola.

The paper will briefly highlight startup difficulties associated with new technologies, outline the modeling exercise and associated conclusion and qualitatively relate the gains to rig specification and design.

Performance Gains With 5th Generation Rigs (SPE/IADC 79833) by **B Keener, K Lbukun**, **Transocean**.

OFFLINE OPERATIONS

BP has combined existing technology with appropriate SIMOPS planning to safely achieve significant cost reductions in deepwater field development by running several subsea wellhead components offline of drilling activities. This was achieved by utilizing conventional subsea wellhead tools that have been adapted for use in open water with the support of a subsea winch located in the moonpool on a mobile offshore drilling unit and an ROV. The traditional method of deploying and installing the equipment using drill pipe requires that this work be done in the critical path of operations, using the rotary table.

Offline operations included deployment of wellhead corrosion caps, gasket seal prep protectors, and two different stack-up height measurement tools ,installation of lockdown hangers, guidelineless re-entry assemblies (GRA) ,brushing the wellhead bore, and injecting corrosion inhibitor.

The ROV system capability has assisted in removing these operations from rig critical path by facilitating the operation, installation and retrieval of the tools.

This offline operational approach was successfully used on BP's Gulf of Mexico Horn Mountain project. The Holstein Team refined the concept and redesigned the tools from lessons learned.

Removal of the operations from the critical path resulted in a minimum savings of 36 days of rig time for the project. These repetitive operations on multiple wells, in a field development scenario, resulted in significant cost savings of $9.75 million, while meeting safety expectations.

Offline Subsea Wellhead MODU Operations Provide Significant Time Savings (SPE/IADC 79834) by **W P Kenda**, **T J Allen**, **BP**; **R R Herbel**, **ABB Vetco Gray**.

Transocean's fleet of newbuild deepwater 5th generation rigs holds several world records including deepest water, deepest subsea completion and deepest moored operation.

DROPPED BOP STACKS

While not a common occurrence, when a BOP stack is dropped it is most often a catastrophe. This paper categorizes causes of documented dropped stacks and significant near misses, identifies root causes within each category and recommends steps that can be taken to reduce the likelihood of recurrence.

With the understanding of the cause of dropped stacks provided in this paper, one will be able to develop specific steps to minimize the likelihood of this type of failure in the future.

Dropped BOP Stacks: Understanding Causes to Improve Prevention (SPE/IADC 79837) by **J P Sattler**, **West Engineering Services**.

LOST CIRCULATION

There was a time when simply dumping some mica or nut hulls down a wellbore was a standard procedure for stopping mud losses. Certainly, these materials still work - for some applications. But, many of today's drilling operations bear little resemblance to that not-so-distant past.

The industry is accelerating its activities in deepwater and depleted zones, both of which present narrow operating limits, young sedimentary formations, and high degree of depletion overbalanced drilling. All of these now common conditions are ideal for fracturing and lost circulation.

Significant challenges exist when drilling through and below salt formations as well. The thief zone at the base of the salt can introduce severe lost circulation and well control problems, often resulting in loss of the interval or the entire well. Controlling losses in this zone has proven to be extremely difficult. Very few effective lost circulation remedies have been successful, especially when drilling with invert emulsion fluids.

The lost time treating severe sub-salt losses can be up to several weeks, with obvious cost implications, especially for deepwater drilling operations.

Methods are reviewed to avoid lost circulation in the subsalt thief zone as well as in the subsequent intervals for a Gulf of Mexico deepwater project and discuss the time and cost savings obtained. For maximum success in these situations, emphasis has been placed on assessment and planning rather than individual lost circulation products.

The authors will detail the Lost Circulation Assessment and Planning process that has been employed to explore and evaluate the specific lost circulation problems and to link them to existing products, systems and services. The integrative pre-planning process analyzes offset-histories and formation data - not only to identify risk zones, but also to gather information on the exact fracture and pore size as well as fracture density.

Then, detailed interval-specific decision-tree charts are developed for stopping losses encountered while drilling or tripping in.

In addition to detailing the lost circulation assessement and planning process, the authors will outline the lessons learned on the deepwater project featuring pre-planning issues geared toward ensuring circulation is maintained throughout the well bore.

Lost Circulation Assessment and Planning Program: Evolving Strategy to Control Severe Mud Losses in Deepwater Projects (SPE/IADC 79836 - Alternate) by **W Sanders**, **Conoco**; and **C Ivan** and **D Powell**, **M-I Drilling Fluids**.