DEA deepwater workshop results in ideas for JIPs

APPROXIMATELY 116 DRILLING engineers attended the **Drilling Engineering Association's** deepwater workshop last June in Galveston, TX. In addition to learning about the latest technology available to aid engineers in their deepwater efforts, a number of companies also presented their products during the exhibition portion of the conference.

Presentations made during the two-day event included such topics as lightweight aluminum risers and optimizing risers for deepwater operations; performance gains with 5th generation rigs, closing the gaps on vessels and tubulars; annular flow and wellbore stability; improved drill pipe properties on BOP shearing capabilities; and new blowout prevention methods for ultra-deepwater.

In addition to the presentations and exhibits, both days included breakout sessions for the engineers to meet in various discussion groups covering topics ranging from drilling rig issues, tubulars, deepwater/deep well, annular flow, wellbore stability and well control.

One of the reasons for the breakout sessions was to identify potential joint industry projects with the aim of finding solutions to various problems. Following are several topics from the breakout sessions that identify areas of potential JIPs.

FLAT TIME

Operators are still experiencing 10% to 15% trouble time in almost every well. Anything that could be done to address that flat time is obviously going to make a huge difference in the total cost of the well.

A lot of flat time is involved in deepwater in ballooning formations. Engineers are always trying to figure out if the well is ballooning or if it is trying to flow.

In order to determine ballooning versus flow there must be flow meters that are reliable enough and accurate enough to accomplish that.

Summary of JIP candidate:

• Determination of "ballooning" vs. flowing wells using new flow meters.

HYDRAULICS

The first area identified for a possible JIP candidate was underbalanced deepwater drilling. The group discussed the drilling system and what changes would have to be made to be capable of operating in 12,000 ft of water.

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Summary of JIP candidate:

• Determining the capability of underbalanced operations in 12,000 ft of water.

SLENDER DRILLING RISER

A slender drilling riser was defined to be 14-in. ID. The subset of the wells that could be drilled with a slender drilling riser was discussed, and how the problems of ECD and slenderizing vs. the pore pressure and frac rating would be dealt with.

Summary of JIP candidate:

• Determining which wells could be drilled with a slender (14-in.) riser while dealing with ECD, pore and fracture pressure.

DUAL GRADIENT DRILLING

Another opportunity for a JIP, not aimed at technology but aimed at the problem of doing what has gone before, is how could the industry commercialize dual gradient drilling.

What would it take to commercialize a dual gradient system?

Summary of JIP candidate:

• What would it take to make dual gradient drilling fully commercial.

NANOTECHNOLOGY

Rice University has an active nanotechnology program, and it was suggested that there may be opportunities to look at what kind of problems there are as an industry.

One of the technologies coming from nanotechnology is monomolecular layer materials technology where a single molecule layer had a different property than underlying material.

Summary of JIP candidate:

• Examining the technologies available from nanotechnology and applying them to the oil and gas industry.

WELL CONTROL BREAKOUT

There were numerous issues associated with the reliability of acoustics such as water temperature, aerated fluid, and the general consensus that the acoustics do not work well in deepwater. One of the thoughts was electrical BOPs where the BOP is controlled through electricity and electric motors.

Useable volumes for accumulator systems and whether or not there was sufficient volume downhole in deepwater to continue adding volume was discussed.

Thoughts turned toward Naval technology. What is the Navy doing that might easily transfer to our industry in terms of acoustics and whether or not they are finding better success than the E&P industry.

The group discussedpressure monitoring, at the BOP stack or at the surface, to help what is going on in terms of pressures at the wellhead.

There was discussion about advanced well control training for deepwater well control. Are there specific circumstances for deepwater that can be examined and train people for deepwater well control?

The group then discusses how to safely shut in drillpipe pressure using motors and floats. It was brought to the group's

attention that the driller's method should not matter, but it was also brought out that underground blowouts could still occur while using the driller's method. There was a separate discussion on whether that wouldn't have occurred anyway just based on the type of tolerances that we are dealing with in terms of ECD, pore pressure and fracture gradient.

Ballooning versus a kick is a daily issue in deepwater. How do we determine ballooning? People need a lot of discipline to determine whether it is ballooning. The group determined that the industry needed to find better ways of monitoring the flow trends to determine that issue.

It was brought up that the industry might need another Best Practice Manual to determine ballooning because there is no science as to how much you bleed off.

Some say not more than ½ point kick tolerance and other people say a few barrels. There is no real rhyme or reason to a certain degree to determine whether it is ballooning versus a kick.

The group discussed insulating the riser and all of the things that need to be done to keep heat in the system. There was a discussion on wire lining of drill pipe and whether it is an issue for well control.

Specifically when you are doing a wireline operation due to pipe recovery or due to fishing in the hole, how do you control the well and what are the best practices in doing that type of operation?

Summary of JIP candidates:

• Determine the limits of acoustical control systems, either what is available through the industry or the Navy.

• Ultra deepwater subsea chokes and control systems. It could include the instrumentation of BOPs to determine pressures and temperatures and instrumentation of drillpipe characterizing a kick.

There might be some work to be done as to when would be the best time to look at how we control a kick from chokes at the surface. Are there ways to better do that job by putting method? Control or choke at the wellhead.

• Is there advanced control training for deepwater well control? Is there industry consensus as to what are the best methods? IADC issued the well control manual but they didn't address the training issues as to what are the best ways to train our people in that area.

• Establishing the best practices for determining ballooning vs. kick detection. There is a lot of discussion there. It is a major problem for operators that we find on a daily basis. As an industry they have not come up with a best practice for determining that issue. It is a learn as you go method for each operator. It might be beneficial of a group like IADC best practices or well control guidelines to get together and address that issue.

Topics discussed duirng breakout sessions included flat time during drilling operations; hydraulic issues; risers, well control; wellbore stability; and annular flow. A number of potential joint industry projects resulted from the breakout sessions.

• If you carry an IADC deepwater well control manual, it doesn't address wireline issues in the drillpipe. We need to include that in the manual.

WELLBORE STABILITY

The group discussed some of the potential opportunities to develop a database of leak off test data. One of the issues there is understanding the healing effect that goes on after a test, which actually fractures the formation. It was mentioned that there is an available database from Norway.

Another possible JIP would be to collect core data from the Gulf of Mexico to try and prove the rock strength predictions. Another idea in the same direction is to collect data on horizontal stress on a regional basis to try to know the regional stress when you are planning a well.

The group also discussed the economic drivers for some of these JIPs. The key is that you can't do an appropriate development plan unless you understand what you are doing, which means the data is required early in the project. However, it is easy to measure the cost and frequently difficult to measure the value, which leads to something that is just coming to us from another area of technology and that is the financial modeling.

One of the values of data is to reduce risk and so in order to quantify the value of data you need to do risk analysis.

Summary of JIP candidates:

• Examining opportunities to develop a database of leak off test data.

• Collect core data from Gulf of Mexico wells to prove rock strength predictions.

ANNULAR FLOW

The three areas discussed in the group were flow accuracy, metering and sustaining casing pressure.

The group also discussed pumping some kind of a gel to seal off the zone prior to pumping the cement to prevent the zone from flowing as well as some kind of mechanical aid to help shut off flow.

Pulsation aid to help the cement set was also discussed. This has been successful in some of the land operations but how could it be applied in the deepwater market?

The two main points about sustained casing pressure were monitoring and mitigation, and primarily subsurface.

The group discussed mitigating capabilities relating to shallow water flow such as pumping fluids, which is expensive but generally solves the problem.The industry has this problem of the annular flow, but we are not really doing anything about it, and we can't get anyone's interest to join in and help solve the problem.

What needs to be done is to look at how the risk can be quantified, what these problems are in annular flow and how can we identify and do a proper root cause problem analysis to get us to the right solution.

Summary of JIP candidate:

• Determine how the risk of annular flow can be quantified, the problems and how they can be identified, and be capable of performing a root cause problem analysis.