DEA hears project updates, potential new JIPs

THE DRILLING ENGINEERING Association's (DEA) first quarter 2004 meeting provided timely updates to active projects as well as several proposals for potential new DEA projects.

An update on the DEA Workshop set for 22-23 June in Galveston was also presented. Thirty-six abstracts had been received for the workshop, which has as its theme this year Step Changes in Drilling Technology 2004. The Advisory Committee would consider additional abstracts and plans are to finalize the program by 1 April.

DEA 119

Jim Bridges with **Knowledge Systems** presented an update on DEA 119 (*Proposal to Develop an Improved Methodology for Pre-Drill Pore Pressure and Fracture Gradient Prediction for Deepwater Wells*), which recently completed Phase II and is preparing to begin Phase III. The project is centered around pore pressure and deepwater.

Phase I of this project began in 1999 and concluded in 2001 with 24 companies participating. A lot of deliverables resulted from Phase I including detailed geopressure reports to data contributors; drilling, log and geopressure database for 75 deepwater Gulf of Mexico wells; survey and analysis of all the methods that were used for pore pressure analysis; guidelines for processing seismic data for the purpose of pore pressure prediction; new methods and models for deepwater pore pressure prediction using seismic velocity data; a deepwater best practice pore pressure prediction manual; and training courses.

The focus of Phase II in 2002 and 2003 was two-fold and built upon the conclusions in Phase I. One of the conclusions of Phase I was that the basin modeling that was used appeared to be one of the most effective ways to predict pore pressures in different areas. Phase II focused on building four models of four basins, three in the Gulf of Mexico and one off Eastern Canada in the Scotian basin. The other leg of the Phase was to work on rock strength and fracture gradient methodology and rock properties.

The conclusion from all of this is the recommendation that the basin model approach as the optimal way to predict pore pressure. It is updatable with real time drilling data.

On the rock strength side, the motivation for this project was the fact that there is significant amount of time associated with losses due to uncertainty in fracture gradient prediction. The group focused on locally calibrated leak off tests and came up with a fracture gradient profile.A total of 300 different leak off tests were analyzed from six different regions in the Gulf of Mexico. All the tests were from overpressured wells. The group performed a quality review of the leak off tests and we generated some guidelines for the test as well as a best practice to evaluate the leak off test. The project involved putting together a best practice and recommendation for a leak off test.

The objective for Phase III is to try to evaluate pore pressure subsalt., again through the basin modeling approach. This could be a fruitful way to project under the salt and also to model the development of a salt body and intrusion over time. Phase III will require seismic data volumes that is fairly sensitive data to most companies so the approach is probably to have fewer participants, perhaps 4-6 companies. Each company will provide 3D seismic data for the project. A detailed analysis of the data will be performed and the results given only to the project participant. General conclusions will be available to the other project participants.

"We are not necessarily making it a DEA project per se," Mr Bridges noted, " but certainly we solicit interest from DEA participants."

"Our experience on the other two projects has been that one of the most difficult parts of the project is to get the data," he continued, "and to get the data for this project is going to take cooperation from the exploration companies."

DEA 148

DEA Secretary **Mike Killalea** presented the update on DEA 148 (*Hard Rock Drilling Performance Improvement Through Impregnated Drill Bit Technology*) on behalf of **Arnis Judzis** with **TerraTek**. DEA 148 was incorporated within a US Department of Energy-supported Deep Trek project entitled Authorization of Deep Drilling Performance. Terra Tek will develop and test prototypes of novel drill bits and advances in high temperature and high pressure tools suited for deep drilling operations. With its private industry partners, TerraTek will characterize technologies, develop and supply new bit prototypes and drilling fluids and field test prototypes. Researchers will benchmark the performance of emerging products by conducting drilling tests in its laboratory. Phase I benchmark drilling testing will occur during the first half of 2004.

DEA 151

Brian Schwind with **PPI Technology** updated DEA 151 (*Modernization of Connection Performance Properties*). The database structure will be linked to the actual test report to provide an archive of over 2,000 tests. Included in the database is probably about 90% of the available API data.

Various companies have approached API connections differently. What is available now is objective evidence and some supplemental specifications to actually ensure performance under worst case conditions. DEA 151 is looking at maximum data and minimum software which would cost about $15,000 dollars for roughly $50 million dollars worth of test data, according to Mr Schwind. The group will be trying to

complete the contract phase the first half of this year and complete the API performance, including tests and distributing specifications, by June. Proprietary data and possibly some API data will be continually funneling in and will be distributed to the participants, so it is considered to be an evergreen project.

DEA 153

A summary of DEA 153 (**Honeywell Deep Trek High Temperature Electronics JIP**) was presented by **John Rodgers**, **NETL/DOE**. The JIP has had three meetings, in November and December 2003 and January 2004, primarily to discuss and plan the components to be developed in the JIP. The group will have another meeting in April.

Five components were discussed. One of the largest stumbling block could be the high temperature microprocessor, which may or may not be part of this JIP strictly because it could be an enormous cost to accomplish.

The April meeting will be basically to plan the components and come to a final conclusion. From that point the JIP will develop the components. Honeywell presently is beginning work on 16-bit and 32-bit processors at their plant.

POTENTIAL DEA PROJECTS

Tom Fate with **ChevronTexaco** outlined *Deepwater Improved Coring Efficiency with Real-Time Data Collection* as a possible future DEA project. Project vision is to develop a set of coring tools that will allow the operator to see what is being cored during the coring operation.

The opportunity is a reduction in deepwater rig cost if the industry can eliminate sidetrack coring completely. If the industry can get the coring costs to under $1 million per core rather than the current $3.5 million dollars per sidetrack core, it provides a lot of opportunity to save money.

"The problem now is that people want to do the sidetrack, Mr Fate explained, "but when you start giving the geologists the cost, they say they would rather not, I don't need that core. But they actually do, it is just that they aren't going to pay the money."

A work plan for 2004 would be to assess the opportunities and determine interest and ideas. If there interest then group would begin looking into the state of the art and then set up a development plan.

Deliverables for 2005, for example, would be begin construction of a prototype standard core barrel with smart sensors and run it in the field. The JIP would then begin examining the feasibility of advancing the wireline retrievable core. In 2006 the JIP would design and implement the smart wireline.

Another potential DEA project presented by **Ken Malloy** with **Mohr Engineering Division** of **Stress Engineering Services** was *Probabalistic Approach to Risk Assessment of Managed Pressure Drilling in the Gulf of Mexico*.

Statistical studies developed from the offshore drilling database maintained by the MMS demonstrate consistent problematic areas for concern. Over 650 gas wells were studied from the period of 1993 to 2002. All of these wells were drilled in a conventional manner, that is overbalanced. On these subject wells, stuck pipe, kicks, and lost circulation accounted for one-third of all the downtime during drilling operations.

About 24% of all drilling days are spent fighting hole problems, which negatively influence ROP by 30%, impact the cost per foot by an additional 23%, and increase the days to TD by 26%. The common denominator is that all of these wells are drilled in an overbalanced, open system environment, sometimes far in excess of what is required to maintain hole stability and well control.

The DEA is being encouraged to undertake a risk analysis to help determine if advances in current drilling technology can help mitigate a significant amount of this trouble time. Managed Pressure Drilling (MPD) is not a new concept but it is a slight departure from what has historically been taught.

The Managed Pressure Drilling Subcommittee of the IADC Underbalanced Operations Committee is an existing internationally knowledgeable body of experts that are capable of differentiating the risks between conventional overbalance drilling in an open system with managed pressure drilling that is modestly overbalanced but controlled in a closed system.

In a recent Managed Pressure Drilling Forum, this IADC subcommittee agreed to be the custodian of the common body of knowledge available to the industry on the subject of MPD.

As soon as funding is appropriated every effort will be made to fast-track the project. The MPD subcommittee meets every quarter. It recently met in The Netherlands in mid-March. Although the fuse is short, should funding be appropriated the subcommittee could be prepped for the Qualitative Assessment (Phase I) for its May meeting in Houston.

Carry over work will proceed over subsequent quarterly meetings. Polling for Quantitative Assessment (Phase II) would follow close on the heels of Phase I. Once the objectives are realized, a report can be written and discussed in the March, 2000 MPD subcommittee meeting. With timely funding, the results could be presented at the annual DEA summer meeting in June, 2006. ■