

Slimhole Sand Control Evaluated at Malaysian Workshop

Remedial and slimhole sand control completions took center stage at a recent SPE Advanced Technology Workshop (ATW) held in November 2008 in Penang, Malaysia. Titled "Chasing Lost Reserves with Remedial and Slimhole Sand Control," the ATW reviewed methods for maximizing recovery of reserves in place by using economical through-tubing and slimhole sand control technologies.

Over the course of three days, 64 participants from 25 different organizations and 11 countries reviewed state-of-the-art sand control technology and recent technical advancements. They also benefited from the experience of other operators who shared case histories and established a network for information exchange with fellow participants.

Cochairpersons Michael Bailey (Drilling and Completions Engineer with ConocoPhillips) and Raymond Tibbles (Stimulation and Sand Control Adviser, Middle East and Africa, for Schlumberger), opened the ATW with an overview of the goals and objectives for the workshop. They encouraged all attendees to participate with any lessons learned from sand control technologies that they had applied.

This was followed by the keynote address by Haji Kamaludin Bungsu, Asset Manager (Western Asset), Brunei Shell Petroleum (BSP) Company. Bungsu's speech provided an overview of the reserves recovery challenges facing operators in the region, with particular emphasis on the cost and time required to develop new assets and the need to recover the maximum amount of reserves from existing developments. He then discussed the problems associated with brownfield sand production, either due to failure of primary sand control or late-time for-

mation failure when no sand control was installed. He finished with a list of some of the options BSP was exploring to address these issues, while reiterating the need for more and better tools for later term sand remediation and better working relationships between operators and service companies.

The first technical session was a discussion on the economic drivers for remedial sand control and the need to think about a well's entire productive life during the initial design phases. An overriding message was how initial completion choices drive the decisions for the rest of the well life and how some simple changes can produce a significant impact. One example detailed how increasing the size of slimhole completions from 3.5 to 4.5 in. can create many more remedial possibilities at lower risk.

The next two sessions reviewed the various techniques available for through-tubing and slimhole sand control. Discussion topics ranged from resin consolidation and screenless fracture packs to through-tubing gravel packs, vent screens, and expanding tubular applications. In addition to discussing the techniques themselves, much time was devoted to weighing the risks associated with these techniques and their impact on productivity.

Case histories were presented from around the world, including representation from most of the Southeast Asian countries (China, Japan, Indonesia, Malaysia, Brunei, Thailand, and Australia) as well as Europe, North America, and South America. These case histories demonstrated the vast difference in job frequency between the US Gulf of Mexico and the rest of the world, with the vast majority of jobs being performed in the Gulf

of Mexico. It was quite clear that there is much opportunity to apply these technologies more consistently in Southeast Asia.

Technical sessions on the second day were devoted to lessons learned from successful and unsuccessful sand control completions. The challenges of well intervention in very mature wells were discussed, and the point was stressed that the actual sand control portion of an intervention is not always the cause of success or failure. In many instances other well problems such as corrosion, cement bond, and packer leaks become the key focus of whether the intervention will succeed. In addition, some failures of both primary and remedial sand control can be attributed to poor perforating, acidizing, or other completion practices.

The third day opened with additional case histories on recompleting with a sidetrack and a monobore, screenless fracture packing, and slimhole openhole gravel packing. One case study presented a study in which nearly every type of sand control was attempted with a 70% failure rate. While the target of the discussion was how to remediate the failures, the focus shifted to discussing what could have gone wrong with the process to deliver such poor results. After reviewing these case histories, a strong recommendation for detailed post-project reviews/look backs was made, as this was considered the most effective way to capture project knowledge.

A breakout session followed in which 5 groups comprised of 10 to 12 people brainstormed key topics and provided potential opportunities and solutions. Group 1 was designated "Twilight Year" (sand control solutions for mature fields). This group

focused on how much sand production an operator might tolerate, the challenges of brownfields (failed gravel packs, monobore or conventional wells, multilayered zones, depletions, and so on), and types of old technology that have been implemented unsuccessfully. The group identified several solutions for these challenges, including coiled-tubing and through-tubing gravel packs, finding and sealing off the sand production, and fracturing past the problem zone.

Group 2 was designated "Collaboration, Collaboration, Collaboration! What Can the Sand Control Industry do Better to Plan Sand Control Well Interventions and Initial Completions?" It identified several challenges to effective collaboration, including intellectual property, project planning, data access, technology application, and competency levels. Suggested solutions included better licensing facilitation between operators and vendors and ensuring that intellectual property is secured before disclosing information across parties. The group stressed that early involvement between the operator and vendor

during concept generation and project planning, coupled with a clear and structured exchange of information, are important.

Group 3 discussed sand prediction models and the need to integrate these models early between operators and service companies. It also reviewed sand management philosophy plans, the importance of understanding reservoir potential, and full lifecycle cost evaluation on early prevention versus remedial (differ investment for more flexibility) sand control. Group 4 suggested ways in which SPE and the sand control community could ensure better communication of slimhole sand control techniques going forward, including more SPE conferences to debate brownfield sand control, dedicated technical sessions in SPE conferences, implementing a sand control Technical Interest Group on SPE's website, and developing a "Sand Control Cookbook and Menu" that guides engineers through the field basics of a sand control job and includes do's and don'ts.

The fifth breakout group took a "Crystal Ball" approach to discussing which sand control considerations

should receive greater attention in a well's predevelopment planning. The group assessed that slimhole sand control should be designed such that productivity and reservoir connectivity are preserved. Planners also need to have a good understanding of the long-term utility plans for the wellbore, as well as the expected sand production forecast. They need to have a good logistics plan in place in terms of equipment and manpower supplies for the sand control completion well before the job is to begin.

The technical program ended with discussions on new technologies and tools that had not yet received wide acceptance or use. The reviewed technologies included the use of coiled-tubing drilling in slimhole sanding environments, the use of swelling elastomers, and a new screen design to prevent catastrophic screen failure. This was followed by a discussion of depth filter screens versus surface filter screens. While none of these were considered "silver bullet" technologies, attendees were still encouraged to see that advancements were continuing on many different fronts.

Underbalanced and Managed Pressure Drilling Techniques Discussed in Vietnam

The Vietnamese city of Ho Chi Minh was the host of an SPE Applied Technology Workshop (ATW) titled "Underbalanced and Managed Pressure Drilling: Technologies for Improving Drilling Performance, Enhancing Production and Reducing Project Risk." From 12 to 15 October 2008, 80 participants representing 45 different organizations from 16 countries discussed the value that underbalanced and managed pressure drilling (UBD and MPD) technologies can deliver to a range of projects worldwide.

UBD and MPD technologies are employed to accurately control annular pressure during the drilling and completion of wells. The intention of MPD is to avoid continuous influx of formation fluids to the surface; any influx incidental to the operation is bled off and overbalanced conditions are quickly restored. In the case of UBD operations, the pressure exerted

in the wellbore is intentionally less than the pore pressure of the exposed formations with the intent of bringing formation fluids to the surface.

When used correctly, both technologies can dramatically reduce well construction time, reduce or eliminate drilling fluid-related formation impairment, reduce mud loss costs, and lower nonproductive time created by kick control. In addition, they can deliver a range of downhole information that can be used to optimize well designs and field development plans to improve overall field efficiencies.

This ATW was designed to further the understanding among operators and service providers of the potential of these technologies, and also to provide an understanding of optimal equipment designs for each application. The workshop also aimed to ensure that regional issues associated with technology uptake were better understood such that engineer-

ing and management staff could better capture UBD and MPD value for their companies, wherever they might operate.

The keynote address by Do Van Khanh, Chief Executive Officer of PetroVietnam Drilling Corporation, was titled "Petroleum Developments in Vietnam and the Application of Enhanced Drilling Technology to Improve Recovery." He gave an upbeat assessment on Vietnam's overall petroleum activity and the impact that MPD was beginning to have in the granite basement reservoirs. MPD has also been successfully employed as a drilling enabler, to solve kick/loss problems in carbonate reefs above the clastic reservoirs.

Khanh also mentioned his company's recent successful MPD operation on their rig PVD-1 which achieved a record measured depth for Vietnam. He also discussed the overall petroleum picture in Vietnam and recent new

developments among PetroVietnam and the other companies operating in the country.

Ben Gedge, one of the cochairs of the ATW and Vietnam Country Manager for Weatherford Vietnam, gave the opening presentation entitled “Where Have We Come From—The Shift to MPD.” He took the attendees through the last 10–15 years of UBD and, more recently, the shift to MPD—particularly in the Asia Pacific region—where MPD technology is proving to be a valuable drilling enabler.

ATW Cochair Dave Elliott, the Global Tight Gas Well Technology Focal Point for Shell E&P International, followed with a presentation entitled “Workshop Objectives and Our Focus for the Future.” His talk concentrated on which UBD/MPD technologies will be important over the next five years. Elliott projected that MPD as

a drilling enabler will increase in use, especially in high-pressure/high-temperature and depleted wells. UBD is expected to increase in use with more tight gas projects, where it has value in drilling enabling, damage reduction, and reservoir characterization. Increased application of UBD in tight gas exploration and appraisal wells is also expected.

The first two technical sessions reviewed how MPD and UBD projects should be addressed to achieve a successful business case through to the planning and implementation phase. Several business cases were presented from around the world, including StatoilHydro’s business case for the Gullfaks and Kvitebjorn fields, several UBD and MPD projects and prospects in Vietnam, implementation of UBD and MPD in Shell Libya, and the staged implementation of automated

MPD in depleted deepwater Gulf of Mexico reservoirs.

The second day featured two technical sessions, both titled “How to Get UBD/MPD Project Approval and Project Team Buy-in.” Presenters discussed ways in which UBD and MPD projects could be elevated to a higher level within a company and how to manage project risks once approval has been given. There was also specific focus given to implementing MPD to improve fracture orientation in fractured granite basement reservoirs, a topic that is particularly important to operators in Vietnam. The country has unique reservoir conditions in the fractured granite basement.

The third day’s sessions asked the questions “How Do We Get Out of the Hole?” and “How Do We Get Back in for Completion Techniques?” Various techniques for pulling the UBD/MPD

GUEST EDITORIAL (Contd. from page 20)

In response, I have told the petroleum engineering students at Texas A&M, “Do not worry. The industry learned its lesson in the 1980s when they did not hire many engineers for a decade and they are paying for it now. Surely, they will not repeat that mistake again.” So far, as I have shared my comments with industry recruiters, the ones who have responded to me have assured me that indeed they plan to continue hiring new engineering graduates from universities, even if they have to pull back spending in other areas. I take them at their word, but I have not done any sort of scientific poll to see if these sentiments are universal.

The oil and gas industry should also realize that the universities have very large freshmen, sophomore, and junior classes. Many of those students are looking for internships during the summer months. These summer jobs are important for a number of reasons. First, most of the students need the money. Second, a successful internship convinces the students that they have made the right career choice and they come back to school ready to work even harder to get their degrees. Finally, it gives industry a chance to evaluate our students and many interns receive

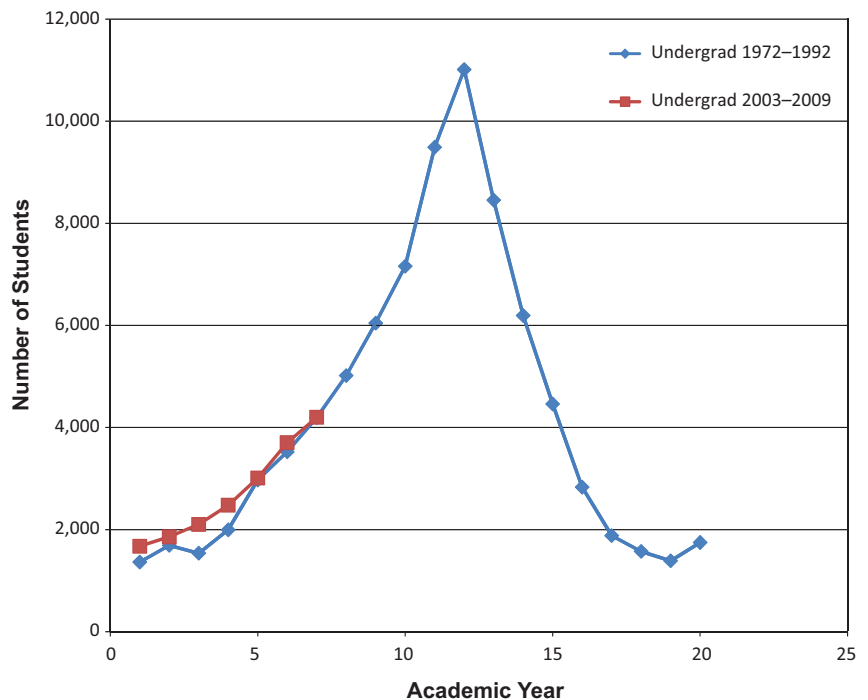


Fig. 2—Comparison of growth trend in undergraduate student enrollment.

tools out of the hole without damaging the wellbore were discussed, including the use of downhole valves, snubbing and stripping, employing hydraulic workover units, and incorporating chemical isolation. Several technologies were then highlighted for getting back into the wellbore to complete the well, including the use of swellable packers, drill-in liners, performing a completion under pressure with a downhole deployment valve, and drilling with casing in a UBD mode. Several of these technologies were also highlighted in a poster session held later that day.

A range of technologies in the MPD/UBD tool box were discussed in the next session, with particular attention on new projects and technologies which have been developed since the last Asia Pacific MPD/UBD ATW a year ago in Kunming, China. Some of the new technologies reviewed included Grant

Prideco's Intellipipe wired-drillpipe technology for high-speed, high-volume data transmission from downhole to the surface; the integration of a surface blowout preventer into MPD/UBD operations; rate of penetration gains from the use of clear drilling fluids; and improved methods of drilling-data acquisition during MPD/UBD.

Elliott closed the workshop with a summarizing address and a survey of when the next MPD/UBD ATW should be held. The consensus was to delay the workshop, which is traditionally held annually, and instead hold the next MPD/UBD ATW in 18 months time, again in Southeast Asia. **JPT**

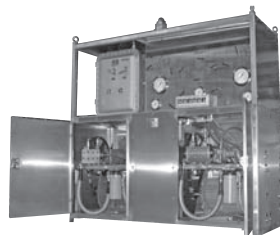
permanent job offers on the basis of their performance. In addition, if the internship is structured properly, the student can perform a project that can lead to substantial profits or increased efficiency for the company.

The heads of all the departments of petroleum engineering are working overtime to increase enrollment, find new faculty, improve curriculum, and turn out more of the graduate engineers that industry has been asking us to do for the past 5 years. Now it is time for the industry to do its part by continuing to support departments of petroleum engineering and continuing to hire both our graduates and our students looking for internships.

We have heard for most of this decade the cry of "The Great Crew Change" and the dire dilemma the oil and gas companies will be in during the next 5-10 years as many of their current engineers reach retirement age. The problem was caused by the lack of hiring in the 1980s and early 1990s. The question now is, "What will the oil and gas industry do this time?" Will the industry repeat the mistakes of the past or will it continue to hire our graduate engineers? We need to know soon. **JPT**

**Tired of
operating
on your BOP
test unit
BEFORE it
will operate?**

**THE FIRST
AND ONLY
TEST UNIT WITH
ABSOLUTE
REDUNDANCY.**



Clover Tool units are solid stainless steel, explosion proof and all electric for fast, reliable BOP, hose, valves, valve systems, manifolds and riser line hydrostatic testing.

CLOVER TOOL CO.



70-0...A Winning Record

Clover hydrostatic test units combine the most reliable features and components into a small footprint design. Our record speaks for itself. With over 70 units in the field, we've had zero failures over 7 years. Clover test units are easy to customize, maintain and operate anywhere on the rig. Our dual 20,000 psi. Model CTU-20P-D2-4 triples your hydrostatic test capabilities. During critical operations, one side can be used as an immediate back-up. When operating in tandem as a single station, BOP fill/test time is cut in half. Operating independently, integral twin recorders allow separate tests simultaneously at different psi.

For less critical operations our economical 15,000 psi. single test unit Model CTU-15P-S1 is packed with features and has a long history of fast, flexible, flawless performance. Get complete details and specifications

@www.clovertool.com

www.clovertool.com • 281-561-5600