UBO Committee promotes advancing technologies

AS RESERVOIR PRESSURES drop worldwide and industry explores more challenging operating environments, drilling and production problems increase making exploration and development programs more costly. One solution to these challenges is the use of underbalanced drilling and completion technologies.

Some would argue that underbalanced drilling has been around since the first wells were drilled, resulting in historic photos of "gushers" like Spindletop.

Today's underbalanced operations (UBO), however, are planned and engineered to avoid hydrocarbon releases that could compromise crew safety and the environment.

IADC's Underbalanced Operations Committee is at the forefront of the development of standards and practices that promote the safe implementation of the technology worldwide.

The IADC Underbalanced Operations Committee was formed in 1998 and since that time has developed various documents that are now culminating in a set of recommended practices for underbalanced operations.

The cornerstone of this work is the IADC Classification System for Underbalanced Wells. This risk-based system of categorizing wells has given the industry a way to recognize the different equipment and practices required for various types of operations.

Building on the Classification System, the Committee went on to examine manufacturing specifications for equipment commonly used in UBO.

In the absence of standards for some important items, the group wrote specs that are now being adopted by the American Petroleum Institute.

At the same time, other Committee members focused their attention to HSE and training. One subcommittee drafted UBO training standards for inclusion in IADC's RIG PASS and WellCAP accreditation programs.

Likewise, other members authored the IADC Underbalanced Operations – HSE Planning Guidelines to give inexperienced operators and contractors insight into proper planning for underbalanced wells.

The recommended practices, currently under development, will draw from all of these, producing a comprehensive roadmap for safely applying this important technology.

The UBO Committee is chaired by **Mike DuBose**, **Rowan Drilling UK Ltd**. The Vice Chairman is **Fred Curtis**, **Halliburton**. Additional Committee officers include **John Ramalho**, **Shell**; **Rick Stone**, **Signa Engineering**; **Johan Eck-Olsen**, **Statoil**; **Sid Ruiz**, **Petroleum Engineers Inc**; and A**drian Houlbrook** and **Brian Grayson**, **Weatherford**.

The UBO Committee's first priority was to establish a common framework of the types of underbalanced operations. The result is a risk-based well classification system that includes six levels from Zero to 5, and A (Low Head) or B (UBD) categories under each level.

While the UBO Committee has accomplished quite a bit during the past five years, more work lies ahead.

The Committee is always seeking additional participation from drilling contractors, service companies and especially operators engaged in underbalanced programs.

The next quarterly meeting of the UBO Committee is 30-31 August in the Netherlands.

For more information about the Underbalanced Operations Committee, check the IADC website at http://iadc.org/committees/underbalanced/index.html.

WELL CLASSIFICATION

The UBO Committee's first priority was to establish a common framework of the types of underbalanced operations.

The result is a risk-based well classification system that includes six levels from Zero to 5, and A (Low Head) or B (UBD) categories under each level. The levels are as follows:

- Level 0 -performance enhancement only; no hydrocarbon containing zones;
- Level 1 -Well incapable of natural flow to surface. Well is 'inherently stable' and is low level risk from a well control point of view;
- Level 2 -Well capable of natural flow to surface but enabling conventional well kill methods and limited consequences in case of catastrophic equipment failure;
- Level 3 -Geothermal and non-hydrocarbon production. Maximum shut-in pressures less than UBD equipment operating pressure rating. Catastrophic failure has immediate serious consequences;
- Level 4 -Hydrocarbon production. Maximum shut-in pressures less than UBD equipment operating pressure rating. Catastrophic failure has immediate serious consequences;
- Level 5 -Maximum projected surface pressures exceed UBO operating pressure rating but are below BOP stack rating. Catastrophic failure has immediate serious consequences.

STANDARDS

Adoption of the Well Classification System led to a gap analysis designed to identify needed equipment specifications. Based on this report, the Committee prioritized its needs and began work on the most safety-critical piece of equipment, the rotating control device.

Under the leadership of John Ramalho of Shell, a group of manufacturers drafted a manufacturing specification which is currently being reviewed for adoption by API, with the goal of having it approved by the International Standards Organization (ISO).

A second task group, chaired by Brian Grayson, Weatherford, has drafted specifications for non-return valves. These, too, are being balloted by API for adoption.

RIG PASS

Early on, the Committee recognized the

need for standardized safety orientation training for crews involved in UBO activities.

In response, a UBO RIG PASS accreditation system was developed and designed to meet two requirements. First is to identify core elements of training programs for new rig employees.

Secondly, it will provide a means of recognizing programs that adhere to those elements. UBO RIG PASS accredited programs are available in the US and Europe.

UBO RIG PASS accreditation is open to all drilling and ancillary service contractors, commercial providers, educational institutions and agencies.

Completion of the accredited program confirms that personnel have met the requirements defined by safety and training professionals irrespective of the rig's location.

WELLCAP

The need for standardized training extended to supervisory level personnel as well. In February 2001, the IADC UBO Committee and WellCAP Review Panel released curriculum guidelines for supervisory-level personnel in underbalanced operations.

UBO techniques require a different approach to well control than conventional over-balanced drilling.

Supervisors need to be schooled in the new challenges these operations present to be ready to respond safely and competently. The WellCAP UBO curriculum is designed to convey this competency to individuals already familiar with conventional well control practices.

HSE

The need to conduct underbalanced operations safely has been at the center of all the Committee's activities. To assist inexperienced companies with the application of the technology, the UBO HSE Planning Guidelines were adopted in April 2003.

While the guidelines offer definite recommendations, they should be considered as a starting point in the development of safety management systems and associated operational plans and procedures.

The guidelines' framework is in the context of an IADC Level 4 type UBO, however, the principles and recommendations have general relevance regardless of well classification. They are applicable for both onshore and offshore UBO.

RECOMMENDED PRACTICES

Development of a comprehensive document collecting UBO best practices from around the globe began earlier this year.

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The Canadian Association of Oilwell Drilling Contractors (CAODC) is joining in development of the recommended practices .

Through this cooperation, the knowledge and experience of Canadian operators and contractors will be captured in a document designed to benefit the industry worldwide.

MANAGED PRESSURE DRILLING

A new subcommittee has recently been formed to develop guidelines for managed pressure drilling (MPD). The group is led by Rick Stone, Signa Engineering, and Johan Eck-Olsen, Statoil.

Additional participation in this subcommittee by drilling and service contractors and operators is welcomed

MPD is defined as an adaptive drilling process used to precisely control the annular pressure profile throughout the wellbore. The objectives are to ascertain the downhole pressure environment limits and to manage the annual hydraulic pressure profile accordingly.

Much of the equipment used in the MPD process, as well as the objectives is closely aligned with underbalanced drilling operations.

CONFERENCES

Two conferences of special interest to UBO practitioners are scheduled for this fall and early 2005. Both of the conferences will present important information and case histories about this emerging technology that is increasing in use around the world.

A new conference for IADC is the IADC/SPE Managed Pressure Drilling Conference that is scheduled for 20-21 April 2005 in San Antonio, Texas.

The SPE/IADC Underbalanced Technology Conference & Exhibition is scheduled for 11-12 October in The Woodlands, Texas. The technical program on 11 October includes Reservoir Case Studies with presentations discussing underbalanced drilling in Canada and another presentation about underbalanced drilling in nothern Thailand. A session on Reservoirs inclues presentations on the impact of thief zone identification; UBD well productivity; and numerical simulation of gas inflow during UBD and the impact of UBD on longtime well productivity. Papers will also be presented on MPD and methane hydrate drilling; mud cap drilling; and well control problems in deep water. Additional technical papers will discuss enhanced well productivity; reduction of wellbore effects on gas inflow; UBD for production enhancement in the Rasau oil field; and UBD as a tool for optimized drilling and completion.

A reservoir panel session will identify issues that tend to either facilitate or impede implementation of UBD and to determine whether the issues change with experience.

Presentations on 12 October will include HSE training, implementation and production results; utilization of UBD techniques in low-pressure reservoirs; and a safe approach to UBD in H2S environments.

A panel will discuss modeling and answer the question "What's the Point?" that will include software professionals and users.