2014 SPE/IADC Managed Pressure Drilling & Underbalanced Operations Conference & Exhibition

ENHANCED DRILLING

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In general, drilling rig have remained unchanged for decades. With the new technology today, crews from 20 years ago would struggle to adapt to these changes. Automation controls are being utilized in place of the traditional manual controls, new methods of drilling are being advanced and the industry must hire, train and drive employees toward competency in a timely fashion, while minimizing costs and maximizing productivity.

- Austin Johnson, Technology Engineer, Managed Pressure Operations (SPE/IADC 168947)
- Ryan Haggins, Global Technical Instructor, Weatherford (SPE/IADC 168959)
- Petar R. Radulovic, Manager – Global Drilling Training Initiatives, Diamond Offshore Drilling, Inc.
- Ken Smith, Manager Dual Gradient Drilling Implementation, Chevron

Continuous circulation of drilling fluid offers many benefits including better control on downhole pressure in relation to pore and fracture pressures and wellbore cleaning. The concept of continuous circulation has been known to the industry from a long time but has gained much higher significance in recent years as monitoring and control of downhole pressure has become possible in real time. Continuous circulation provides an uninterrupted stream of data from sensors mounted downhole and on surface equipment even while making measurements. This is used to produce estimates of unmeasured quantities, such as gas distribution, and to perform reservoir characterization.

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A PDS has been developed to ascertain geo-margins and adjust wellbore pressure. Pressure Drilling Verification of Pore and Fracture Pressure Margins during Managed Pressure Drilling

Case History of the First Application of Managed Pressure Drilling in the Jurassic HPHT Formations in a North Kuwait Well

KOC has embarked on a new project to develop the high quality light oil and associated gas found in the Jurassic reservoirs of the North Kuwait oilfields. The project required the drilling of over 120 new deep wells, the majority of which are deviated or horizontal. In order to gain more information on the reservoir characterization and to try and identify if reservoir performance would be enhanced, it was decided to run a trial using Managed Pressure Drilling (MPD) techniques to drill the reservoir sections. The planning, designing, and implementation of this project will be discussed.

Overcoming a Challenging Narrow Window of 0.35 ppg – Successful Automated MPD & M PC Application in Offshore Malaysia – A Case History

This program was the second attempt (well re-visit) at drilling target sands that were unable to be reached while drilling the well during the original program. The first attempt to drill the 6” hole experienced a loss-gain scenario in the first of the three sand targets which was penetrated 80m below the shoe. After many failed attempts to control the losses, it was decided to plug and abandon the 6” open hole and temporarily suspend the well. After a year of suspension, a new drilling approach of using a statically underbalanced mud weight in combination with an automated MPD system was introduced as the best solution to re-visit the program and drill the well objectives. During the planning stage, different scenarios were analyzed based on coal and sand FG and PP predictions. A thorough risk assessment was conducted prior to finalizing an MPD plan using a statically underbalanced mud while drilling, running the liner, and during managed pressure cementing.

A brief introduction of the MPD process will be given followed by the implementation of automated early kick detection. Background information addressing a case history event from Western Canada and a technical review of the event will be made. Thereafter an in-depth investigation of the event supported by dynamic well control simulations will be presented. Under the light of the findings the presentation will be finalized by a comparison of MPD and conventional well control methods from a well control standpoint.

Networking Break & Open Exhibition

MudCap Drilling: New Variations, Drivers, Limitations, and Lessons Learned – Case Histories

Multiple case histories of wells planned and drilled using Mud Cap Drilling variations focusing on Variations, Candidate ID, and Lessons Learned will be outlined. The ultimate goal of this work is to serve as a basic applicability and screening guide for MudCap Candidates. The MCD variations discussed are: Floating MudCap Drilling (FMCD), Pressurized MudCap Drilling (PMCD), and Dynamic MudCap Drilling (DMCD).

MDP Toolbox for Floating Drilling Units

The controlled mud level technology is further developed to allow for new applications of the system. By combining different technology elements, several benefits can be achieved. Introduction of riser mounted annular elements extends the use and improves the safety of the technology. Introduction of a Rotating Control Device further improves the efficiency and safety of the technology. Finally, by connecting to the choke line below the slip joint the technology can be used for riser gas handling and safer use of drilling methods without mud return to surface such as Floating Mud Cap Drilling and Pressurized Mud Cap drilling.
MDP Application on ERD Well in Offshore Peninsular Malaysia – Reducing Cylindrical Fatigue Forces Across the Weak Formations by Managing the ECD


MDP was introduced in this well to reduce the cylindrical fatigue forces across the weak formations by maintaining the BHP constant at all times. The well was successfully drilled with lower MW and was able to achieve high flow rates and eventually improved the hole cleaning. The MW was designed 2ppg below the wellbore stability point while the ECD was maintained between 0.3ppg window during entire drilling and tripping operations. Scheduled MDP rollover from light to heavy MW and vice-versa were followed in order to maintain ECD within the pre-established window. This paper aims to elaborate the application of Automated MDP on this specific ERD case from conceptual, planning to finally execution. Also, it is intended to share the challenges observed and mitigations taken during the execution phase.

Experiences from 1st Use of Pumped Riser Technology

Gjertrud Skaar, Principal Researcher, Dag Ove Molde, John-Morten Godhavn, Per Christian Stenstorne, Kjell Rune Toftevåg, Statoil

Experiences with technology qualification and first use will be presented. The first use is planned Q4 2013/Q1 2014 at a depleted field offshore Norway, where the purpose is to reduce downhole pressure while drilling by reducing the mud level in the marine drilling riser in order to mitigate losses. A drilling rig has been modified to prepare for the pumped riser application.

Planning Managed Pressure Drilling with Two-Phase Fluid in a Depleted Reservoir

Saad Saeed, GBA-Regional Manager (ESSA), Mark Juskiw, Isabel Poletałzy, Halliburton; Martyn Parker, TAQA (SPE/IADC 168946)

The Bergermeer Rotliegend sandstone reservoir has been depleted by production. This has substantially reduced reservoir pore pressure and well deliverability. Pressure depletion has been accompanied by a decrease in minimum in-situ stress, resulting in a substantially sub-hydrostatic drilling fluid density required to enable drilling. As a result, Managed Pressure Drilling (MPD) using two-phase fluid has been chosen as the enabling technology for drilling and completing initial wells for the Bergermeer Gas Storage Project. This paper documents the key planning considerations required to design and complete a highly depleted reservoir using two-phase MPD techniques.

15.30 Networking Break & Open Exhibition

Madrid IV & Benelux Room

16.00 MDP – A Look into the Future

Session Chair: Brian Grayson, GPLM Secure Drilling Services, Weatherford

Riser Isolation Device for MDP on Floating Drilling Units

Roger Stave, Senior Technology Advisor, AGR Enhanced Drilling; Ivar Kjæsnes, Statoil

A new Demo 2000 development project has been started where the aim is to develop a specially configured Riser Isolation Device. The Riser Isolation Device is simple and robust “choke” that can be used within a Marine Drilling Riser in combination with a subsea mud pump that generates and controls a differential pressure across the “choke”. This Riser Isolation Device will enable managing ECD and bottom-hole pressure on floating drilling units. Initial engineering and testing results will be presented.

Field Trials of a New Continuous Circulation Sub

Jim Weir, Mechanical R&D Engineer, Shantur Tapar, National Oilwell Varco

There is an increasing need to drill difficult reservoirs in a cost effective way. Managed Pressure Drilling (MPD) is one of the techniques that have allowed access to a significant number of challenging reservoirs. Over the past few years MPD has made it possible to drill wells which have narrow pore and fracture pressure gradients. The full-scale proof of concept testing and field trials of a new approach to a side-entry sub system for continuous circulation will be presented.

17.00 Adjournment

Unassigned Papers of Note: The following paper proposals will be included in the conference if a scheduled paper becomes unavailable. In addition, these presentations will be made available in the SPE/IADC conference proceedings, should the author so desire.

Dual Gradient Screening Tool: Depth Ratio (DRx) Matrix Method

Sagar Naunduri, Drilling Engineer – MPD Specialist, Kent Fortney, George Medley, Shifling, Tian, SIGNA Engineering Corp. (SPE/IADC 168950)

Depth Ratio Matrix Method or “DRx Tool” was developed as a simple screening tool for Dual Gradient Drilling applications based on evaluating multiple pressure profiles for DGD. The DRx tool with the “ρDRx matrix” serves as a quick and easy evaluation guide for any potential DGD application. This can help evaluate both normal gradient drilling and pressure regulation profile applications.

A Simple Transient Flow Model for MDP and UBD Applications

John Emeka Udognam, Research Fellow, Kjet Øv Kjeldsau, Steinar Ejev, Gerhard Nygård, University of Stavanger (SPE/IADC 168960)

An introduction or background information to the work will be presented. This will be followed by description of the work flow, showing the transient modeling process and how the numerical scheme can be used for well control procedures. The result section will contain presentation and interpretation of the model predictions for managed pressure drilling, underbalanced operations and dual gradient drilling. Finally, a summary or conclusion of the work will be presented.

HOTEL INFORMATION

Hotel NH Eurobuilding

Padre Damián 23, 28036 Madrid, Spain
Phone +34 91 353 73 37 • Fax +34 91 353 00 17
sales.nheurobuilding@nh-hotels.com • www.nh-hotels.com

For reservations please use the link provided on the conference website.

Single/Double Room – Euro 130, Inclusive Breakfast 10%
Rates available until 7 March 2014.

REGISTRATION

www.iadc.org/conferences/MDP_UBO_2014

EXHIBITORS

• AGR Enhanced Drilling
• Dag Ove Molde, Statoil ASA
• National Oilwell Varco
• Gary Massey, Nexen Petroleum USA
• Managed Pressure Operations
• Ray Bullock, Halliburton
• EFC Group
• Stuart Butler, Canrig
• Expro
• Egidio Palliotto, Saipem
• M-I Swaco
• Martin Culen, Blade Energy Partners
• Managed Pressure Operations
• Kristin Falk, AGR Enhanced Drilling
• Managed Pressure Operations

Safekick

Ken Gray, University of Texas at Austin

Wild Well Control

Brian Grayson, Weatherford

Expro

The Well Academy

M-I Swaco

Weatherford

Managed Pressure Operations

The Well Academy

M-I Swaco

Wild Well Control

Exhibition and Sponsor Opportunities are still available! Please contact europe@iadc.org / +31 24 675 2252 for more information.

CONFERENCE PROGRAM COMMITTEE

A special thanks to the following committee members for their support in organizing the conference:

• John Kozicz, Transocean Drilling
• Roger Stave, AGR Enhanced Drilling
• Sara Shayegi, Shell International
• Mark Madsen, Weatherford
• Robert Ziegler, Petronas
• Juan Carlos Beltran, MI-Swaco
• Mike Vander Staak, Hess
• Giovanni Botto, Eni E&P
• Shantur Tapar, National Oilwell Varco
• Ray Bullock, Halliburton
• Wild Well Control
• Stuart Butler, Canrig
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• EFC Group
• Dual Gradient Screening Tool: Depth Ratio (DRx) Matrix Method
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