Drilling Economics, Torque And Drag Mitigation And Lateral Length: Best Practices For Reducing The Time And Cost Of Horizontal Drilling In Shale Gas And Tight Oil Plays: Completions Optimization Through The Eyes Of The Driller

THE FIRST EVER CONGRESS FOCUSED ON OPTIMIZING PRODUCTION THROUGH THE EYES OF THE DRILLER IN SHALE GAS AND TIGHT OIL PLAYS

✓ LATERAL LENGTH: Evaluating The Economics Of Horizontal Drilling To Assess When Drilling A Longer Lateral With More Stages Will Yield A Commercial Rate Of Return

✓ BUILDING THE CURVE: Exploring How To Increase Rop On The Build Section To Improve Curve Drilling Efficiencies

✓ TORQUE & DRAG: Examining How Torque And Drag Modeling Can Been Utilized To Increase Rop And Reduce Drilling Costs

✓ DRILLING FLUIDS: Assessing The Costs And Effectiveness Of Muds In Relation To Cleaning The Hole, Reducing Torque And Drag, Maintaining Well Control And Stability And Ultimately, Facilitating High Levels Of Production

✓ ROTARY STEERABLE: Discussing The Efficiency Of Rotary Steerable Tools In The Build And Lateral Sections Along With Failure Rates And Costs To Establish Whether They Are Worth The Added Expenditure

✓ CEMENTING: Optimizing The Application Of Cement To Improve Wellbore Integrity And Protect Ground Water At Minimal Costs

✓ REGULATIONS: Examining Current And Future Ground Water Protection And Annulus Pressure Regulations To Establish Possible Impacts On Operations

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Horizontal drilling rigs in the US grew significantly from 362 February 2011 to 823 September 2012 meaning 58% of all onshore rigs in the US are now horizontal. This growth has led to increased success in horizontal well recovery and, with plays such as the Mississippi Lime and Granite Wash now being revolutionized by horizontal drilling, the trend is set to continue into 2013 and beyond. These successes could not have been possible without the industry’s openness to innovation and unwavering attitude to improving drilling operations in terms of costs, time and ultimate recovery and, with the recent fluctuations in commodity prices, there has never been a greater focus on cost efficiency within the driller’s remit.

This focus on efficiency calls again for new drilling innovations and requires the sharing of the latest horizontal case studies showing how new technologies, tools and techniques continue to optimize drill time, facilitate increased recovery in completions and ultimately, justify the expenditure on new drilling technology in shale and tight oil plays such as the Bakken, Eagle Ford and Permian.

**Horizontal Drilling U.S. Shale & Tight Oil Plays** is the first ever US-wide congress to present a technically detailed and economically focused initiative with solutions given purely from the drillers perspective. It brings together executives and technical experts from the Bakken, Eagle Ford, Permian, Marcellus, Mississippi Lime, Utica and other major US shale plays to share best practices for optimizing well drilling operations through transferable lessons.

**Day one** will evaluate the economics of drilling a longer lateral, methods for increasing the ROP on the curve and how to select the optimal degree for drilling the curve. Operators will also analyze innovations and technological advances within MWD and LWD tools, rotary steerables, drill bits and motors. The initiative goes on to analyze cementing the lateral to ensure a smooth wellbore with optimal integrity.

**Day two** has a focus on torque and drag modelling to prevent non-productive time and will examine latest drilling muds including an analysis of mud type, an assessment of the possibility of managed pressure drilling within different plays and provision of hole cleaning solutions, fluid loss prevention techniques and hole stability maintenance. The day is completed with an assessment of ground water protection and HSE issues to prevent operational disruption.

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“Nice range of topics covered, good pace and structure, excellent venue”

_Conoco Phillips_
Day One
Wednesday February 20, 2013

Examining Lateral Length Economics, Techniques for Building the Curve, MWD/LWD Optimization, Rotary Steerable Cost-Benefit & Cementing Methods

Day One will explore the optimization of tools that contribute to building the curve including MWD/LWD tools, drill bits, rotary steerable and conventional motors. It will establish best practices for surface and intermediate cementing:

Keynote Case Study: Drilling Economics

9.00 Providing A Case Study Of An Operator That Has Minimized Drilling Costs Between 2007-2013 To Outline Areas Of Potential Performance Improvement
- Explaining the key success factors which lead to reductions in drill time and how this can benefit overall drilling costs
- Discussing improvements made through company integration and performance optimization to outline areas where drilling efficiencies can be created
- Evaluating the benefits of using air drilling for top hole work to reduce drill time costs
- Hearing how Wellbore Review can lead to year on year drill time improvements

Don Robinson, VP Drilling, Range Resources

9.30 Question & Answer Session

Field Development Case Study

9.40 Providing A Thorough Analysis Of Drilling Economics To Drive Down The Costs Of Field Development
- Evaluating the production case histories within shale and tight oil plays to demonstrate how to recover more reserves with less expenditure
- Evaluating how running an economic model on ROR and ROI based on incremental production can assess the optimal lateral length
- Evaluating how rock type, play characteristics and ease of drilling can be used to define the costs of drilling the lateral
- Comparing completed well production and estimated ultimate recovery to the complete drill cost as a guide for modelling future lateral lengths

Dennis Rohan, VP Engineering & Finance, Focus Exploration

10.10 Question & Answer Session

10.20 Morning Refreshments In Exhibition Showcase Area

Case Study: Top Hole Drilling

10.50 Comparing Spudder Rigs To Horizontal Rigs To Demonstrate Potential ROP Increases And Drill Cost Savings
- Using a spudder rig’s higher mobility, cheaper day rate and drilling capabilities to reduce costs
- Explaining the areas where cost savings can be realized to plan for the future adoption of spudder rigs
- Detailing the impact on water flows due to drill time minimization

Al Owings, Drilling Manager, Carrizo Oil & Gas

11.20 Question & Answer Session

Increasing ROP On The Curve

11.30 Exploring How To Increase ROP On The Build Section To Improve Curve Drilling Efficiency
- Discovering what BHA perform most efficiently and provide for consistent build rates
- Examining the barriers to tool face consistency when using a PDC bit in the build section and suggest room for improvement in bit design

Ravi Srivastava, General Manager Drilling, Consol Energy

12.00 Question & Answer Session

Lunch In Exhibition Showcase Area

Drill Bits & Motors

3.40 Examining The ROP And Steerability Of Drill Bits To Reduce Drilling Times And Achieve An Efficient Build Section
- Analyzing the rate of penetration of different drill bits to understand their application in different formations and maximize efficiency when drilling
- Assessing how blade count, gauge length and size of cutters impact the ROP of different drill bits and enable day rate savings
- Discussing the steerability of drill bits and slide drilling motors to build to the lateral leg as quickly and smoothly as possible
- Assessing the application of motor technology in relation to drill hole size to evaluate which motors can be used in small drill holes to assess future drill bit investment
- Examining the durability of drill bits to prevent tearing up of bits and reduce time spent tripping to replace them as well as additional tool costs

Aldo Gurrendi, Senior Drilling Engineer, Halcon Resources

4.10 Question & Answer Session

Cementing The Lateral

4.20 Providing A Case Study On Cementing The Lateral To Establish Best Practices Across Major US Unconventional Plays
- Providing tried and tested techniques for cementing the lateral to ensure well control and groundwater protection
- Discussing cementing the string to prevent annular gas migration
- Assessing well designs from the Marcellus, Montney and Eagle Ford to provide best practices when cementing in specific plays

Rich Billa, Principle Technical Expert Unconventional Oil & Gas, Shell

4.50 Question & Answer Session

Cementing Techniques

5.00 Optimizing The Application Of Cement To Improve Wellbore Integrity And Protect Ground Water At Minimal Costs
- Determining the appropriate, most cost-effective number of casing strings needed to maintain well control and formation protection
- Establishing cementing best practices to avoid gas migration between casing strings
- Ensuring cementing achieves adequate protection of ground water to adhere to stringent environmental regulations
- Discussing the benefits of going the extra mile to provide greater reassurances to the government and general public
- Estimating the torque and drag on the well path when operating a rotating cement head to prevent breakage of the down hole casing

Kirk Harris, Cementing Specialist, Talisman

5.30 Question & Answer Session

5.40 Chair’s Closing Remarks

5.50 – 7.00 Networking Drinks Reception In Exhibition Showcase Area

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Day Two
Thursday February 21, 2013

DRILLING MUDS, CUTTING DISPOSAL, MANAGED PRESSURE DRILLING, HOLE CLEANING & TORQUE & DRAG REDUCTION

Day Two will assess the effectiveness of different muds, explore the effects of these muds on fluid loss and hole stability and examine methods for reducing torque and drag. It will finish by identifying optimal cutting disposal techniques and hearing the latest regulations on water contamination.

8.20 Chair’s Opening Remarks

BREAKFAST PANEL: CONTRACTUAL DRILLING SERVICES

Matching Contracted Drilling Expertise To E&P Requirements To Ensure Highly Educated, Dependable And Appropriately-Priced Labor For Every Horizontal Well

The Drilling Contractor Breakfast Panel will provide a forum in which Drilling Contractors can showcase their contractual services and discuss how these services can meet the latest E&P requirements on horizontal wells.

8.30 E&P Case Study: How an E&P Company has Achieved Onsite Drilling Efficiencies Through Service Company Partnership

- Identifying the skills required in drilling managers, supervisors and engineers to form a competent workforce
- Explaining how workforce dependability and experience influence contractor selection
- Detailing the potential for developing long term relationships with service companies when high quality labor is supplied

Cecil Cowell, VP Drilling, Forest Oil
Rene St. Pierre, VP, Chesapeake
James Pettit, Drilling Engineer, FML Resources

8.50 Contractor: Explaining How The Drilling Contractor Aims To Meet These Aims To Guarantee Effective Labor

- Detailing the current personnel labor pool and availability of highly trained labor in US shale plays
- Describing the latest personnel training programs and procedures to minimize future well site error
- Explaining how confident and experienced personnel can reduce drill time and average daily rate costs

9.30 Discussion

START OF CONFERENCE

KEYNOTE

9.40 Case Study: How An Operator Has Taken Days Off The Schedule Through Strategic Drilling Program Management

- Examining the areas of drilling that incur most time to strategically plan for improvements where they are most needed
- Hearing how mistakes and time-consuming errors have been avoided to reduce the overall cost of the drilling program
- Forecasting how improved drilling efficiencies can increase production levels

Graham Mensa-Wilmot, Drilling Engineering Advisor, Chevron

10.10 Question & Answer Session

TORQUE AND DRAG

EVALUATING TECHNIQUES FOR TORQUE AND DRAG MODELING TO ELIMINATE DRILLING STOPPAGES IN THE FUTURE

10.20 Examining How Torque And Drag Modeling Can Be Utilized To Increase ROP And Reduce Drilling Costs

- Discussing the uses of modeling to establish torque, overpulls and tension at any given point on the drill string
- Identifying ways to ensure the entire team knows and follows the model to avoid issues resulting from miscommunication such as stuck pipe
- Understanding the applications of modeling to prevent the need for reaming and ultimately, reduce non-productive time

11.20 Question & Answer Session

DRILLING MUDS AND HOLE CLEANING

ASSESSING THE USE OF MUDS IN MINIMIZING TORQUE AND DRAG, CLEANING THE HOLE, MAINTAINING STABILITY OF THE WELBORE AND AVOIDING FLUID LOSS AT MINIMAL COST

12.00 Providing A Case Study Of Water Based Mud Usage Within The Cleveland Formation To Justify Drilling Mud Selection In Relation To Costs And Lateral Length

- Addressing how to mitigate the risks of using water based muds in tight gas horizontals whilst utilizing the most cost effective fluids option
- Analyzing how the drilling fluids impact the hole stability to reduce the associated risks
- Evaluating the effectiveness of water based muds to reduce torque and drag
- Justifying the fluid selection with relation to drilling economics to ensure selection of the most cost efficient solution

Jason Clendenen, Senior Drilling Engineer, Jones Energy

12.30 Question & Answer Session

12.40 Lunch In Exhibition Showcase Area

MANAGED PRESSURE DRILLING

1.40 Assessing The Use Of Muds To Control Formation Pressure When Drilling Long Laterals

- Comparing the characteristics of limestone and shale formations to assess if the rock can withstand pressure drilling whilst maintaining well bore stability
- Examining the optimal systems and logistics used for managed pressure drilling to ensure well bore collapse risk is minimized
- Providing a method for calculating the optimal pressure for the rock type to balance optimal drill penetration whilst minimizing hole collapse risk
- Identifying areas in which managed pressure drilling has been successful to map the optimal areas of future development

1.50 Question & Answer Session

HOLE CLEANING

2.20 Examining Methods For Effectively Removing Cuttings From The Well Bore To Reduce Torque And Drag

- Comparing laminar flow and turbulent flow to assess their effectiveness in removing cuttings from the wellbore
- Understanding the effect of drill string RPM to determine the optimal rotational force from the drilling rig
- Discussing the effectiveness of reaming in minimizing doglegs and micro doglegs
- Examining the advantages and disadvantages of wiper trips to determine if the added non-productive time will reduce torque and drag down the line

2.50 Question & Answer Session

FLUID LOSS

3.00 Using Pre-Planning And Remedial Techniques To Minimize Fluid Loss And Prevent Lost Circulation

- Discussing the transmission of fluid into depleted zones to establish how fluid loss can be affected by previous drilling in the area
- Evaluating how to match data to historical models to provide insight on how clean the wellbore is

Patrick Okimi, Senior Drilling Engineer, Marathon Oil
Stephen Martinez, Division Drilling Manager, Bopco

3.30 Question & Answer Session

HOLE STABILITY

3.40 Matching Rock Properties With Drilling Muds To Reduce The Absorption Of Water In The Formation And Ensure Stability In The Wellbore

- Assessing how rock geomechanics affect stability of the shale to give insight into the consequences of rock behaviour
- Examining the ability of the different mud types to inhibit the instability of shales to avoid issues down the line such as stuck pipe
- Discussing the outcome of swelled shales on frac propagation to establish the possible effects on production levels
- Analyzing the interaction of mud rheology and formation properties to prevent excessive fluid absorption

Zheng (Michael) Yao, Senior Geophysical Engineer, Hess

4.10 Question & Answer Session

4.20 Afternoon Refreshments In Exhibition Showcase Area

CUTTING DISPOSAL & REGULATIONS

IDENTIFYING OPTIONS FOR EFFICIENT DRILLING WASTE MANAGEMENT AND HEARING THE LATEST ON GROUNDWATER PROTECTION LEGISLATION

4.50 Examining Transportation And Disposal Methods For Cuttings To Reduce The Costs Of Complain Waste Management

- Comparing the different tools available to remove drill cuttings and recycle expensive muds
- Exploring the storage requirements for different mud types to quantify the additional expenditure
- Assessing the methods for transporting and disposing of drill cuttings to identify areas for cost reduction
- Suggesting potential alternatives for cutting disposal methods in the future to minimize costs

Neil Trotter, Fluids & Waste Management Team Lead, Chevron
Sam Ledbetter, Drilling Fluids Superintendent, Southwestern Energy

5.50 Question & Answer Session

REGULATORY PANEL

6.00 Discussing Current And Future Ground Water Protection And Annulus Pressure Regulations To Ensure Safety And Efficient Compliance

- Recognizing how to efficiently protect ground water to follow environmental regulations without disruption to operations
- Examining upcoming ground water protection regulations to quantify the time that compliance could add to drilling operations
- Discussing how to monitor pressure between intermediate and production casing to abide by regulations
- Identifying limitations being placed on annulus pressure increases to understand the procedure that will need to be followed

Norman Gearhart, Manager Groundwater Advisory Unit, Railroad Commission of Texas

6.30 Question & Answer Session

6.40 Chair’s Closing Remarks And End Of Conference

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