

## IADC DEC Q3 2021 Tech Forum, “Performance Limiters”

September 29, Wednesday, 08.30-12.15

The IADC Drilling Engineers Committee will hold its Q3 Technology Forum on 29 September under the theme “Performance Limiters.” Our industry has made significant changes over the years regarding drilling performance improvement. Gaining insight and understanding of our performance limiters enables continued technological advancements. Various step change offerings will be needed to overcome these obstacles as we progress and improve overall drilling excellence.

What performance limiters or new challenges present themselves today? What drilling competencies do we need to progress drilling performance? What engineered solutions do we need for optimal drilling efficiency?

This event was held *online via Zoom*.

### Agenda:

**08.30-08.35** Welcome – Dennis Moore, Chairman, and introduction to event – Marcus Howell, Patterson-UTI and DEC Board member

**08.35-09.35** **PANEL DISCUSSION:** Our speakers will kick off the tech forum by discussing their experiences with performance limiters in drilling, providing examples of the challenges they faced and how they overcame them, along with a discussion of the biggest performance limiters in drilling today.

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- Fred Dupriest, Texas A&M University
- Fred Fard, BPX Energy
- Paul Pastusek, ExxonMobil

**09.35-10.05** **“Understanding HFTO as a Performance Limiter with Innovative Vibration Technology,”** John Rodriguez, Occidental Oil & Gas

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Understanding high-frequency torsional oscillations (HFTO) as a drilling performance limiter can only be identified with innovative vibration technology. This presentation will provide insights on how to identify and measure HFTO with high frequency, downhole vibration sensors. An overview of available HFTO vibration tools will be discussed, along with their application in drilling case studies. These case studies will highlight vibration tool placement and summarize HFTO vibration data sets recorded post run.

**10.05-10.35** **“Drilling Digital Twin Predicts Drilling Dysfunctions in Real Time,”** Raju Gandikota, MindMesh

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A novel real-time digital twin has been developed to predict drilling dysfunctions and improve operational efficiencies. Real-time surface data is used as input to predict drilling dynamics and drilling dysfunctions in the bottomhole assembly at any depth. This provides a rare insight for

drilling engineers to improve drilling performance and take predictive or corrective measures for reliability and operational efficiencies.

The twin produces quantifiable drilling dynamics like shock and vibration, downhole MSE, rate of penetration in real time. The method allows seamless workflow for planning, real-time operations and post-job analytics.

**10.35-10.45** BREAK

**10.45-11.15** **“Optimizing Directional Drilling Efficiency and Wellbore Placement with Next-Generation Directional Guidance,”** Joel Dunn, Superior QC

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Contemporary directional guidance algorithms are designed to emulate a directional driller’s bit projection and steering decision logic through automation. This can provide consistency but does little to improve directional performance. HiFi Guidance is a next-generation directional guidance system designed to deliver an accurately placed, superior-quality wellbore while minimizing the time and cost of drilling by optimizing steering decisions. Applying the framework of aerospace GNC systems to directional drilling has led to the improvement of current systems, primarily in the areas of navigation and guidance. In the context of directional drilling, improved navigation requires the use of advanced methods for accurately determining wellbore position and trajectory.

HiFi Guidance is currently in field testing. Performance data collected on several trial wells has shown a potential reduction in lateral slide footage of >60% compared with similar wells drilled by experienced directional drillers.

**11.15-11.45** **“IADC Dull Bit Grading System Upgrade,”** Dustin Daechsel, Shell

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The current IADC dull-bit grading system has been in use, with modifications, since the early 1960s. The system has proved useful, but there is a growing consensus that we have the need and the technology to devise a much more sophisticated, less subjective procedure. One of the main drivers is to formulate a method to forensically study the wear characteristics and relate those characteristics to drilling events, which we now have the capability to identify through recent drilling-data capture technologies. The detection of drilling events and their influence on the dull condition of the drill bit will enable the adoption of event mitigation procedures, which will extend the running life of the bit.

**11.45-12.15** **“The Value in Casing Run Monitoring for Efficiency and Effectiveness,”** John Clark, Volant Products

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While much progress has been made in the area of drilling optimization, there remains considerable opportunity for improving the efficiency and effectiveness of casing running operations, particularly in ERD applications where challenges are encountered in reaching TD in longer wells. Progress has been made leveraging various running strategies and technologies to extend reach, but there are instances where there is still a substantial difference between

anticipated and actual running behavior.

This presentation will provide insights and examples of running efficiency and effectiveness assessments using newly developed software tools that allow for casing running assessments before, during, and after the run to allow operators insights and decision bases for running string configuration and for actions during the run to improve the likelihood of reaching TD and preserving and documenting the integrity of the casing string.

**12.15** Adjournment