

**IADC DEC Q4 2023 Tech Forum,**  
**“Drilling’s Role in CCUS and Geothermal”** *Wednesday,*  
*1 November, 8:30am-12pm*

The role of the drilling engineer will be affected by overall emissions reductions projects and global energy transition agendas. EPA Class II injection wells for Oil and Gas production will become a larger percentage of the total wells drilled. Geothermal wells have been estimated to increase to 1,000 to 3,000 wells drilled per year in the next decade. The number of EPA Class VI wells used for geologic sequestration of carbon dioxide (i.e., carbon capture and underground storage) is also expected to increase. The goal of this forum is to review impacts on drilling engineers of environmental, social & governance (ESG); carbon capture, utilization and storage (CCUS); and geothermal on current and future drilling operations.

The event will be held in person at Wellbore Integrity Solutions, 1310 Rankin Rd, Houston, TX 77073. An online option via Zoom will be offered for those who can’t attend in person. Register on the IADC website for either in-person or online attendance. A light lunch will be provided for in-person attendees at the conclusion of the event.

**Agenda:**

08.30-08.35 Welcome – Matt Isbell, DEC Chairman, Hess; facility and safety briefing – Wellbore Integrity Solutions; introduction to event – Scott Beautz, Robert Urbanowski and Marcus Howell, DEC Board members

08.35-09.00 **“Overview and Highlights of EGS Geothermal Drilling at FORGE 16B(78)-32,”** Sam Noynaert, Texas A&M University Petroleum Engineering [View the presentation](#) [View the Video Recording](#)

This presentation will present a high-level overview of FORGE 16B well drilling (and some completion) operations, including well design with notes on differences due to geothermal. It will also cover insulated DP, RSS vs conventional motors and continued performance improvement due to physics-based limiter redesign. Particle drilling, coring and installation of fiber will be discussed, along with completion operations to date. The presentation is intended to be a summary, bringing the IADC audience up to speed on progress at the FORGE site, as well as giving a few examples of where EGS geothermal drilling differs (and where it is often the same) as oil and gas drilling.

09.00-09.20 **“The Insulated Drill Pipe for Drilling Deeper and Hotter – Field Experience and Thermal Model Validation,”** Alex Vetsak, Eavor [View the presentation](#) [View the Video Recording](#)

To drill deeper and hotter wells, such as for high-temperature oil and gas or geothermal applications, proper management of bottomhole temperatures is critical to ensure survival of downhole electronic tools and to improve drilling performance. A new type of the insulated drill pipe (IDP) has been introduced that minimizes heat transfer from the annulus into the drill pipe in order to deliver drilling fluid to the bottomhole assembly that can be up to 75°F cooler than

using the non-insulated drill pipe. A full IDP string was manufactured in 2022 and was subsequently used in three field trials: a geothermal test well in New Mexico, the USA DOE FORGE project in Utah, and a shale well in Louisiana. During field trials, mud inlet and outlet temperatures and measurement while drilling temperatures were monitored. In some cases, mud chillers were used at the surface to decrease the inlet mud temperature, as a part of a trial. Both real-time and recorded MWD temperatures were obtained. This is the first extended field trial of the IDP, and the results demonstrate the value of the IDP to reduce mud temperatures downhole.

09.20-10.20 Geothermal Panel Discussion: [View the Video Recording](#)

- Cindy Taff, Sage Geothermal
- Ashok Santra, Aramco Americas\*  
\*Comments or opinions expressed during the meeting were the personal and not the official position of Aramco Americas or Saudi Aramco.
- Elliot Howard, Fervo Energy
- Mark Hodder, Eavor
- Moderator: Scott Beautz, National Energy Technology Laboratory\*  
\*Comments or opinions expressed during the meeting were personal and not the official position of the DOE or NETL.

10.20-10:40 Break

10.40-11.00 **“Efficiently Translating Petroleum Drilling Technologies to Adjacent Applications in Energy Transition, Carbon Sequestration and Geothermal,”** Shaun Toralde, Weatherford [View the presentation](#) [View the Video Recording](#)

Petroleum drilling and well construction technologies have been created, developed and refined by the drive to be able to produce hydrocarbon products efficiently and economically. These technology sets involved with creating an oil or gas well can and are being repurposed to assist with drilling wells for alternative purposes, particularly for applications involving the global energy transition, such as: (1) carbon sequestration and storage in appropriate subterranean formations, (2) exploration and development of geothermal resources, and (3) plugging and abandonment (P&A) of existing wells to help mitigate methane leakage into the atmosphere.

In line with its sustainability and energy transition corporate initiatives, Weatherford has focused on these three segments and have undertaken projects to adapt its drilling and well construction technologies to these applications. Case studies of existing or adapted technologies that have been successfully deployed in the carbon sequestration, geothermal and P&A areas will be presented for reference. Lessons learned and recommendations for improvements in future adaptations of drilling technologies in the areas identified as well as in other energy transition topics will also be provided.

11.00-12.30 CCUS Panel Discussion:

- Daniel Guier, ConocoPhillips • Matt Naeher, ExxonMobil
- Jens Hedegaard, Noble Corp
- Misty Rowe, Halliburton
- Shaun Toralde, Weatherford
- Hans Dick, SLB
- Moderator: Marcus Howell, Patterson-UTI

12.30-13.30 Light lunch, provided by Wellbore Integrity Solutions