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Perforating With Lasers:
Are You Ready for the Power of Light?

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Abstract:

Lasers are on track to provide safe, non-explosive, damage-free perforations.

For decades, experts have considered the potential of laser energy to penetrate rock as an alternative well construction and completion method. However, applications of lasers were dismissed as energy intensive and inefficient. Conclusions from nearly 50 years ago continue to affect industry misconceptions despite massive technical developments in laser systems and their applications.

Current industrial laser technology addresses efficiency, portability and reliability issues required for successful commercial field applications on all rock types, including shale. The latest multi-mode configuration of fiber lasers are now capable of delivering multiple kilowatts of power from an efficient, compact laser source with excellent beam quality, reliability and long life. They represent an enabling technology that opens the door for near-term subsurface laser applications under field conditions. Examples of remote surface field applications have been made.

The application of high power lasers for perforating could significantly reduce the primary drawbacks over traditional methods – safety and damage. Lasers can cut through steel, cement and rock, to permit fluid flow with minimal skin damage. Laser perforation concepts were proven under multiple downhole conditions, including pressure. Many drilling, completion and subsurface applications with high power lasers are envisioned.

Biography:

Brian C. Gahan is founder and president of Laser Rock Technologies, LLC, a private energy consulting firm in Cary, Illinois, USA. He was a Senior Scientist and Manager, E&P Technology Development for 16 years at Gas Technology Institute (GTI) in Des Plaines, Illinois. He holds a BS in petroleum engineering, Masters in chemical engineering and an MBA in finance, and a registered professional engineer. He is a member of several professional organizations, including the SPE since 1980, and as a fellow of the American Institute of Chemical Engineers (AIChE). Gahan has authored and co-authored more than 40 papers and technical publications, and is a co-inventor on a U.S. Patent.