

Permian Basin Energy Capital of Innovation: Yesterday, Today, Tomorrow!

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ABSTRACT

The Permian Basin is one of 25 super basins on the planet. The 25 super basins have 780 billion bbls recoverable, and potentially trillions of barrels of resources left to be unlocked. Super basins share common characteristics, including: 1) multiple source rock petroleum systems; 2) conventional, unconventional, and tight reservoir plays; 3) stacked pays; 4) established infrastructures, and; 5) an established service sector. The Permian Basin is America's premier super basin, and is the center for entrepreneurial innovation in America's oil industry.

Innovation is fundamental to finding and developing new resources of oil and gas. Value innovation involves the simultaneous pursuit of increased value (differentiation) and cost reduction. Successful innovation combines five key skills: Associating, Questioning, Observing, Networking, and Experimenting. These five skills are routinely employed in Midland (knowingly or unknowingly), where the prolific nature of the Permian super basin, the close-knit oil field community, and the rich rewards innovators reap when successful, all combine to foster oil field innovations that have global significance.

Innovations in the past led to new plays through the new applications of technology. These innovations had a profound effect in the Permian Basin, and spread across the US. Five innovative Permian Basin case studies include: the first use of 3-D seismic for onshore exploration; horizontal drilling in Bryant G Devonian field; the Spraberry Formation vertical play became the US's first resource play; the Wolfberry vertical and horizontal plays which led to the horizontal Spraberry play; dewatering of conventional reservoirs in the prolific Indian Basin/Dagger Draw field.

Innovations of today are exemplified by the rapid evolution of horizontal completion practices. Resource plays like the Wolfcamp, Bone Spring, and Spraberry are rightly seen as "learning curve" plays: each year's refinement in completion design or better identified landing zone is understood to be part of a continuous improvement for better results. Changes in horizontal technology are now benchmarked in terms of "generations". Well performance from 5 years ago, or even 2 years ago, does not indicate today's well performance. Today's innovations in horizontal well completion design include: increasing sand per foot; drilling longer laterals; adding more stages; less gel/more slick water; and better identification of land zones for each formation bench. With each generation of completion design, successful innovators are rewarded with higher flowing rates and larger ultimate recovery per well. This continuous improvement has led to ever-rising values of acreage and production in the Permian Basin.

Predicting the innovations of the future is impossible. Surely, new innovations are being tested today - the results have not yet released. We do not know exactly what the innovations of tomorrow will be. But we do know that successful innovators will leverage the key innovation skills, and that profound new innovations will continue to be developed in the Permian super basin.